28TH CONFERENCE OF THE EUROPEAN CETACEAN SOCIETY
Liège, Belgium 2014

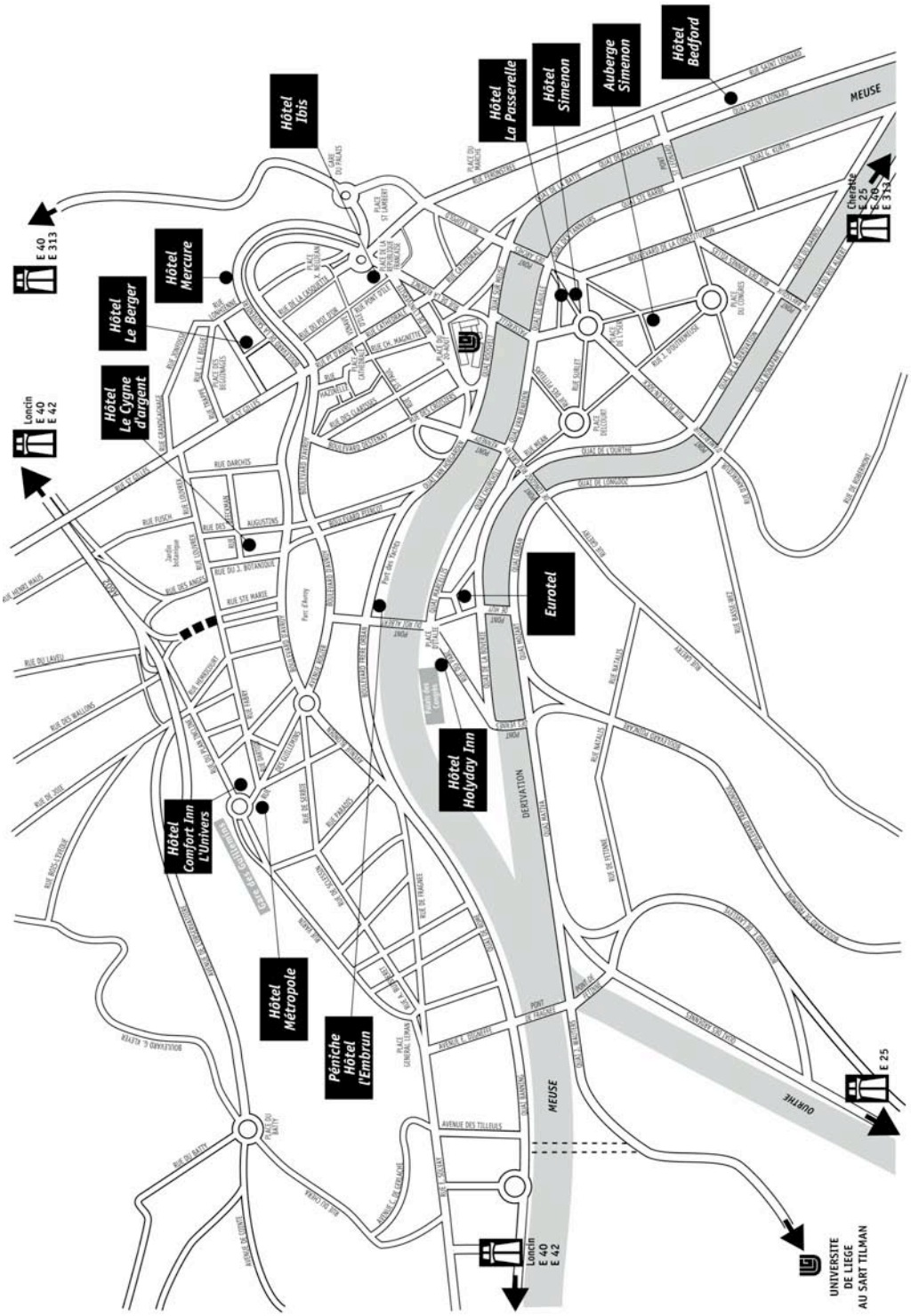
5th-9th April 2014

"Marine mammals as sentinels of a changing environment"

http://liege.europeancetaceansociety.eu

Organization

Liège City



European Cetacean Society

Important Places during ECS conference

Event	Place to be
Main Train station in Liège	Gare des Guillemins
Icebreaker reception, workshops, poster sessions et plenary sessions	Museum-Aquarium de Liège, Quai Van Beneden, Liège
Video Night	Amphithéâtres de l'Opéra, salle Noppius, Place de la République française, 41, Liège (just beside the hotel IBIS)
Banquet and dancing	Société Littéraire de Liège Place de la république Française, 5, Liège (in front of the Galerie Opéra where was held the video session)
Sandwich, piece of chocolate cake or snack craving?	Café des Arts Place du 20-Août, 16, Liège 10% off with your ECS badge!
Gourmet Craving for lunch or dinner?	Le Labo4, just behind the Aquarium-Museum, Quai van Beneden 20/22, 4020 Liège
Evenings drink in a nice, spacious and cozy pub? They provide also tasty veg and non veg food	Brasserie Sauvenière, Place Xavier-Neujean, 12, Liège (5 minutes away from the *Carré* where you can dance the whole night in dozens of different pubs).
Shopping craving?	Shopping mall Médiacité, entrance by the rue Gretry, 5 minutes from Aquarium-Museum
Again shopping craving?	Downtown from Place Cathédrale to Place Saint-Lambert
Other good restaurants in a very old and charming street?	Rue Roture, Outremeuse

The University of Liege will host the 28th annual conference of the ECS from April 5th to April 9th, 2014.

The University of Antwerp (UA), the Catholic University of Louvain (UCL), the University of Ghent (UGhent), and the Royal Institute for the Natural Sciences of Belgium (RINSB) co-organize this event.

The theme for 2014 is: "***Marine mammals as sentinels of a changing environment***" in order to present the consequences of global change on these species as well as the principal dangers that threaten their future.

Program will include two days of workshops and three days of plenary sessions including two poster sessions.

Local organizing committee

Krishna Das and Thierry Jauniaux (ULg, co-chairs), Ronny Blust (UA), Jean-Marie Bouquegneau (ULg), Freddy Coignoul (ULg), Adrian Covaci (UA), Cathy Debier (UCL), Marjan Doom (UGent), Sylvie Gobert (ULg), Jan Haelters (MUMM), Sigrid Maebe (MUMM), Joseph Schnitzler (ULg), Liesbeth Weijs (UA).

International organizing committee

Hanna Nuuttila, Roland Lick, Joanne O'Brien, Toby Oliver, Ayaka Ozturk.

Conference scientific committee

Thierry Jauniaux and Krishna Das (co-chairs), Michel Andre, Ronny Blust, Cristina Brito, Florence Caurant, Pieter Cornillie, Adrian Covaci, Cathy Debier, Steven Degraer, Jacques Godfroid, Ailsa Hall, Olivier Lambert, Graham Pierce, Jan Haelters, Paddy Pomeroy, Tilen Genov, Peter Ross, Joseph Schnitzler, Ursula Siebert, Liesbeth Weijs, Andrew Wright.

We are very grateful to all our collaborators and sponsors for continuous logistic and financial support

Université de Liège	Université de Liège	Café des Arts	LES COURS THÉÂTRE DE LIÈGE
Aquarium-Museum of Liège	Aquarium Muséum	Labo 4	le labo 4
Universiteit Antwerpen, UA	Universiteit Antwerpen	Brasserie de la Lienne	Brasserie de la Lienne
Universiteit Gent, UGent	Universiteit Gent	Delhaize de Boncelles	Delhaize
Université Catholique de Louvain, UCL	UCL Université catholique de Louvain	Brasserie Blérot	Brasserie Blérot Père & fils
Federal Public Service Health, Food Chain Safety and Environment	federal public service HEALTH, FOOD CHAIN SAFETY AND ENVIRONMENT	Delirium tremens	Delirium tremens
Belgian Science Policy Office, belspo	belspo	Rejouisciences, ULg	Université de Liège Rejouisciences
Fonds Wetenschappelijk Onderzoek, FWO	fwo	Pom'Art	Pomart
Fonds de la Recherche Scientifique, F.R.S. –FNRS	fnrs La liberté de chercher	Concours Corsica	concours corsica Université de Liège
Vlaams Instituut voor de Zee, VLIZ	VLIZ	Chocolatier Galler	Galler Chocolatier

Abstract reviewers

Mario Acquarone, Alejandro Aguilar, Eric Alfonsi, Elena Isabel Alonso Velasco, Ayaka Amaha Ozturk, Pia Anderwald, Michel André, Per Berggren, Simon Berrow, Thibaut Bouveroux, Sophie Brasseur, Cristina Brito, Florence Caurant, Pieter Cornillie, Boris Culik, Krishna Das, Léa David, Nick Davsion, Robert Deaville, Eduard Degollada, Sarah Dolman, Greg Donovan, Paulo Dorneles, Ruth Esteban, Peter Evans, Antonio Fernandez, Michael Fontaine, Tilen Genov, Marcela Gerpe, Anita Gilles, Evgeny Goldin, Pavel Gol'din, Jan Haelters, Philip Hammond, Sami Hassani, Erich Hoyt, Maria Iversen, Thierry Jauniaux, Carl Kinze, Roger Kirkwood, Jeremy Kiszka, Virginie Lahaye, Olivier Lambert, Sophie Laran, Finn Larsen, Kristina Lehnert, Mardik Leopold, Colin MacLeod, Barry McGovern, Giuseppe Notarbartolo di Sciara, Katariina Nuuttila, Joanne O'Brien, Ian O'Connor, Simone Panigada, Helene Peltier, Patrick Pomeroy, Emilie Praca, Flore Samaran, Meike Scheidat, Aviad Scheinin, Joseph Schnitzler, Ursula Siebert, Nick Tregenza, Philippe Verborgh, Liesbeth Weijs, Andrew Wright

Student volunteers

Ana Mafalda Correia, Ewelina Heil, Ayca Eleman, Phillipa Dell, Giulia Roncon, Vera Jordao, Gulce Saydam, Lese Costa, Kirsty Medcalf, Joanna Sarnocińska, Menno Pepijn van Berkel , Inger van denBosch, Sara Torres Ortiz, Nina Bircher, France Damseaux, Valérie Stekke, Genyffer Troina, Anouk D'Hont, Tara Grosmans, Linda Buame, Sophie Mounet, Pauline Loos, Jean-Marie Graic, Amandine Gillet, Esther Brihaye, Marianna Pinzone, Ophelie Humphrey, Erdem Danyer, Ben Singleton.

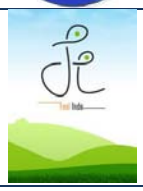
Local helpers

Thank you so much to all members of the *Laboratory for Oceanology*, *Department of Pathology*, the *Aquarium-Museum* and so many others for support before and during the conference:

France Collard, Alice Cransveld, Mariella Lunetta, Renzo Biondo, Dorothée Pete, François Remy, Nathalie Guillaume, Nathalie Chometton, Christian Michel, Marie Bournonville, Carole Champenois, Martine Jaminon, Farida Benichou, Chahrazed Rahmoundi, Isabelle Barts, Françoise Bruls, Pascal Poncin, Eric Parmentier and his "*boys band*".

AND THANK YOU FOR ATTENDING THE 28TH CONFERENCE OF THE EUROPEAN CETACEAN SOCIETY!

Miscellaneous

ECS conference logos design by Delphine Dussaut (delpduss@hotmail.fr)	
Feel-Inde, an ecological and ethical company was chosen to produce beautiful natural and organic cotton bags	
Great music by the Cercle Interfacultaire de Musique Intrumentale (CIMI) financed by the Faculty of Sciences (ULg).	
Cover picture taken by K. Das in collaboration with *Aquatic Mammal and Bioindicator Laboratory (MAQUA), School of Oceanography, Rio de Janeiro State University (UERJ), Brazil*	

Keynote speakers

Ursula Siebert (Germany) is director of and professor at the Institute for Terrestrial and Aquatic Wildlife Research (ITAW) of the University of Veterinary Medicine Hannover, Foundation, Germany. She is an international expert in ecology, health assessment and management of marine mammals. She studied Veterinary Medicine at the University Giessen and Ecole Vétérinaire de Nantes, France (funded by the German Exchange Service and EU-Erasmus-Program). She conducted her doctoral thesis at the Free University of Brussels, Belgium (funded by the European Science Foundation) and at the Justus-Liebig-Universität Giessen, Germany and her habilitation in zoology at the University of Kiel. Prof. Siebert is Diplomate of European College of Zoological Medicine (Wildlife Populations Health). From 1997 to 2004 she was the veterinarian in charge for porpoises and seals of the Fjord- and Belt Centers, Denmark. Her main research interests are habitat use and investigations on health especially for the understanding of effects of human activities on marine mammals. She is member of several advisory groups including TSEG, HELCOM, ICES. Prof. Siebert published more than 150 peer-reviewed publications and book chapters, she supervised numerous Bachelor-, Master-, Doctoral thesis and PhDs on national and international level and was project leader of more than 150 research projects. Prof. Siebert is the 2013 recipient of the *Alexander von Humboldt* research price of the Fond de la Recherche Scientifique (F.R.S.-FNRS), Belgium.

Peter S. Ross (Canada) is the founding Director of the newly-launched Ocean Pollution Research Program of the Vancouver Aquarium. He is an international expert in the area of ocean pollution, having published over 125 scientific articles and book chapters. He served as a Research Scientist with the Canadian government between 1996 and 2013. He is Adjunct Professor at the School of Environmental Studies, University of Victoria. He obtained his PhD from the University of Utrecht in the Netherlands (1995), MSc from Dalhousie University in Halifax, Nova Scotia (1990), and BSc (Honours) from Trent University in Peterborough, Ontario (1985). He has pioneered new techniques to evaluate the effects of persistent pollutants on the health of marine mammals, having led groundbreaking studies on the interactions between contaminants, the endocrine system and the immune system using a combination of field and semi-field studies. He is a frequent advisor to conservation teams in different parts of the world, and has provided advice in support of chemical regulation, species at risk, ocean disposal and ocean health. Dr Ross attaches great importance to his work with coastal First Nations and Inuit communities on issues surrounding safe traditional seafoods. Dr Ross is the 2012 recipient of the *Murray A. Newman Award for Significant Achievement in Aquatic Research* from the Vancouver Aquarium.

Graham Pierce (Scotland, UK) is a professor at Oceanlab, University of Aberdeen and Visiting Chair in Marine Studies at University of Aveiro. He has worked on marine mammals, on diet, life history, contaminants, habitat use and interactions with fisheries, especially in the UK, Spain and Portugal, for over 25 years. He also has research interests in cephalopods and fisheries, and has published over 200 scientific papers. He is a member (and co-chair elect) of the International Council for the Exploration of the Sea's Working Group in Marine Mammal Ecology, which helps ICES formulate advice related to marine mammal conservation, as well as chairing the ICES Steering Group on Ecosystem Function, and is a former ECS Council member. He also collaborates with several governmental and non-governmental organizations who carry out marine mammal monitoring and are involved in the implementation of the Marine Strategy Framework Directive.

SATURDAY 5TH APRIL

WORKSHOPS: Liège Aquarium-Museum – main coordinator

09:00-18:00 **Scientific progress on cetaceans and perspectives in the Pelagos Sanctuary** – Fanny Dubois
09:00-18:00 **SAMBAH spring progress meeting 2014 -** Ida Carlén
10:00-15:30 **Students' workshop: Career enhancing skills only taught through experience - learn from the veterans -** Tobias Rosas Da Costa Oliver
14:00-18:00 **Exploring technologies for improved data capture from platform of opportunity surveys of marine mammals -** Rachel Davies
14:00-18:00 **Aquatic mammals from Latin America -** Paulo Renato Dorneles

SUNDAY 6TH APRIL

WORKSHOPS: Liège Aquarium-Museum – main coordinator

09:00-18:00 **Introducing noise into the marine environment: what are the requirements for an impact assessment for marine mammals? -** Peter Evans
09:00-18:00 **Communicating marine mammal science to the general public –** Volker Smith
09:00-13:00 **New development in pollutant's studies in marine mammals -** Liesbeth Weijs
9:00-13:00 **Euroseals -** Patrick Pomeroy
14:00-18:00 **Emerging Infectious Disease in Marine Mammals: Sentinels of Change in the Environment –** Jacques Godfroid
14:00-18:00 **Marine mammal rescue** - Mark Peter Simmonds
14:00-18:00 **Marine mammals as indicators of historical changes** - Cristina Brito

REGISTRATION - 16:00-18:00 Liège Aquarium-Museum

ICEBREAKER RECEPTION – 18:00-20:00 Aquarium-Museum

MONDAY 7TH APRIL

REGISTRATION – 08:00-8:45 Aquarium-Museum of Liège

OPENING CEREMONY – 08:45. Presence of Academic and Politic Authorities of University of Liège.
Musical animation: **C**ercle **I**nter-facultaire de **M**usique **I**nstrumentale (CIMI)
Only presenting authors are listed below
KEY-NOTE SPEAKER
09:45 **How evaluating the health of marine mammals can benefit their management**– Prof. Ursula Siebert

HEALTH, GENETICS, BYCATCH Chairman: Ursula Siebert
10:30-10:45: **Assessing Temporal and Spatial Trends in PCBs and DDTs in odontocetes since 1980 -** Emma Lockley
10:45-11:00 : **Xenobiotic molecular biomarkers in harbour seals as proxies for pollutant burden and effects? -** Kristina Lehnert

COFFEE BREAK – 11:00-11:30

HEALTH, GENETICS, BYCATCH
11:30-11:45 **Evidence of land-sea transfer of a zoonotic human pathogen, *Campylobacter spp.*, to grey seals (*Halichoerus grypus*) -** Johanna Baily
11:45-12:00 **Gastrointestinal parasites of free-living Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) in the Northern Red Sea, Egypt** - Sonja Kleinertz
12:00-12:15 **Molecular Diet Analysis of Grey Seals (*Halichoerus grypus*) and Harbour Seals (*Phoca vitulina*)** - Mandy Pittman
12:15-12:30 **Genetic vs. Ecological Management Units: What time-scale is relevant for managing threats?** - Joan Gimenez
12:30-12:45 **Exposure of Monachus monachus to heavy metals and potential adverse effects on the population status of the species -** Annalisa Zaccaroni
12:45-13:00 **Revisiting common dolphin population structure in the Northeast Atlantic using a population genomics approach** - Amélia Viricel

LUNCH BREAK 13:00-14:30 - Science Advisory Committee meeting

SHORT TALK SESSION 1 –14:30-15:30 Chairman: Anita Gilles

Marine mammals and fisher networks as sentinels of the changing marine environment in East Africa - Per Berggren
Detection functions of C-PODs: determining the probability of detecting harbor

porpoises using a large hydrophone array - Katharina Brundiers

Underwater noise from seismic oil exploration in Baffin Bay, Greenland - Jakob Tougaard

Population genetic structure of harbour porpoise *Phocoena phocoena* across Europe: implications for management - Angela Llavona Vallina

Direct evidence for grey seal (*Halichoerus grypus*) predation and scavenging on harbour porpoises (*Phocoena phocoena*) - Thibaut Bouveroux

Small Delphinid Strandings in the Bay of Biscay (France): How Much Are Observed Trends Affected by Variations in Reporting Rates? - Matthieu Authier

Long-term research: essential for understanding how cetaceans are indicators of a changing environment in the Central-Southern Mediterranean Sea - Adrianna Vella

ACOUSTICS, ABUNDANCE Chairman: Meike Scheidat

15:30-15:45 **Enhanced detection of harbour porpoises prior to ramming, seismic blasts and ammunition clearance using porpoise communication sounds** - Boris Culik

15:45-16:00 **Assessing the effect of boat traffic on bottlenose dolphin foraging activity using passive acoustic techniques** - Enrico Pirotta

16:00-16:15 **Coda repertoires and social structure of sperm whales (*Physeter macrocephalus*) in the western Indian Ocean** - Leonie Huijser

COFFEE BREAK 16:15-16:45

ACOUSTICS, ABUNDANCE Chairman: Michel André

16:45-17:00 **Effectiveness of real-time detection of harbour porpoises** - Caroline Höschle

17:00-17:15 **Acoustically derived growth-rates of male sperm whales (*Physeter macrocephalus*) in the NW Mediterranean Sea** - Nino Pierantonio

17:15-17:30 **The dolphin biosonar beam is focused in stages: Validation of a vibroacoustic finite element model using bottlenose dolphin simulations** - Vanessa Trijoulet

17:30-17:45 **Large-scale static acoustic survey of a low-density population – estimating the abundance of the Baltic Sea harbour porpoise** - Julia Carlström

17:45-18:00 **Harbour porpoises in the Mediterranean Sea; survey confirms their presence in the northern Aegean** - Anna Cucknell

POSTER SESSION 1 – 18:00 – 19:30 Salle de l'Embarcadère du savoir

OPEN LECTURE - Café des Sciences , in French. 20:00-21:30
« Des mammifères marins et des hommes » Brasserie Sauvenière, Place Xavier-Neujean, Liège.
Thierry Jauniaux, Ursula Siebert, Jean-Marie Bouquegneau and Krishna Das

TUESDAY 8TH APRIL

KEY-NOTE SPEAKER

09:00-09:45 **North Eastern Pacific killer whales on the edge: a story of pollution and climate change** – Prof. Peter S. Ross

ECOLOGY, BREEDING Chairman: Peter Ross

09:45-10:00 **Harbour porpoise life history, diet and fisheries interactions in two regions of the Northeast Atlantic: Scotland (UK) and the north-west Iberian Peninsula** - Fiona Read

10:00-10:15 **Seals on holiday: Expansion of the Grey Seal Population in the Dutch Wadden Sea** - Sophie Brasseur

10:15-10:30 **Spatio-Temporal Distribution Patterns of Harbour Porpoise (*Phocoena phocoena*) Calves in German Waters** - Johanna Kottmann

10:30-10:45 **Highly specified lipid tissues of cetaceans: coupling GC and NMR HR-MAS studies unravels variations in biochemical compositions related to biological functions** - Eric Alfonsi

10:45-11:00 **Can the junk food hypothesis be applied to harbour porpoises (*Phocoena phocoena*) in Dutch waters?** - Eileen Hesse

COFFEE BREAK – 11:00-11:30

ACOUSTIC, BEHAVIOUR Chairman: Sophie Laran

11:30-11:45 **Sound production and behaviour of humpback whales (*Megaptera novaeangliae*) on feeding grounds in NE-Icelandic waters** - Arnar Björnsson

11:45-12:00 **Behavioural responses of long-finned pilot whales to tagging, military sonar and killer whale playbacks** - Fleur Visser

12:00-12:15 **Pre-consent monitoring as part of an Environmental Impact Assessment at the Atlantic Marine Energy Test Site (AMETS) off Co. Mayo, Ireland** - Joanne O'Brien

12:15-12:30 **Meta-analyses of whalewatching impact studies: differences and similarities in disturbance responses among species** - Valeria Senigaglia

12:30-12:45 **Demonstrating robust Consistent Individual Differences in the vigilance behaviours of grey seals (*Halichoerus grypus*) during the breeding season: what more could we learn from a cross-context approach?** - Ross Culloch

12:45-13:00 **Role of bottlenose dolphins and other top predators in linking ecosystem dynamics in the Florida Everglades** - Jeremy Kiszka

LUNCH BREAK 13:00-14:30

Students AGM and NCP meeting

SHORT TALK SESSION 2 14:30-15:30 Chairman: Thierry Jauniaux

Short-, mid- and long-term effect of biopsy sampling on a resident cetacean population - Pauline Gauffier

Vessel activities cause population effects on bottlenose dolphin distribution and behaviour in Cardigan Bay, Wales - Daphna Feingold

Occurrence and behavior of delphinids and harbor porpoises at the northern end of the Istanbul Strait, Turkey - Ayaka Ozturk

Effects of whale watching vessels on male sperm whales (*Physeter macrocephalus*) off Andenes, Northern Norway - Andrea Cosentino

When calling matters: Social and behavioural aspects of long-finned pilot whale vocalisations - Annebelle Kok

Behaviour modification of common bottlenose dolphins relative to vessels in a busy narrow waterway - Sarah Piwetz

Identification of suitable habitats for cetaceans in the Canary Basin, NE Atlantic Ocean: evidences of hotspots for beaked whales - Ana Mafalda Correia

Sowerby's beaked whales in the Azores: ecological insights of an elusive species - Machiel Oudejans

Population ecology of a resident population of common bottlenose dolphins (*Tursiops truncatus*) in North Patagonia, Argentina: the most popular dolphin species on its way out? - Els Vermeulen

ABUNDANCE Chairman: Jeremy Kiszka

15:30-15:45 **Small cetacean habitats around the largest sandbank in the offshore North Sea – The Dogger Bank revisited** - Anita Gilles

15:45-16:00 **Preliminary estimates of cetaceans abundance in the French EEZ** - Sophie Laran

16:00-16:15 **Insight into the North Atlantic fin whale (*Balaenoptera physalus*) population structure by means of stable isotope analysis** - Morgana Vighi

COFFEE BREAK 16:15-16:45

BEHAVIOUR Chairman: Sophie Brasseur

16:45-17:00 **Population Viability Analysis of Mediterranean Monk seal (*Monachus monachus*) and significance of dispersal in survival (Northeast Mediterranean Sea)** - Gülce Saydam

17:00-17:15 **The slaughter of the Southwest Atlantic right whale by 19th century whalers: two decades for decimating the population and five to initiate recovery** - Alejandro Aguilar

17:15-17:30 **A review of an unprecedented mass stranding event of short beaked common dolphins on Cape Cod, MA, USA** - Brian Sharp

17:30-17:45 **A new approach to estimate inter-birth interval in a bottlenose dolphin population** - Monica Arso

17:45-18:00 **Piecemeal programs poorly protect porpoise populations (and those of other marine mammals): Why conservation isn't working** -

Andrew Wright

POSTER SESSION 2 – 18:00 – 19:30 Salle de l'Embarcadère du savoir

Tasting of artisanal belgian Beer "La Lienne" and artisanal juices from Pom'Art

VIDEO NIGHT 21:00 – 23:00 Salle Noppius, Opéra, place de la République Française

Chief coordinator: Loïc Michel

WEDNESDAY 9TH APRIL

KEY-NOTE SPEAKER

09:00-09:45 **Marine mammals and Good Environmental Status: Science, policy and society; challenges and opportunities** – Prof. Graham Pierce

ABUNDANCE, BEHAVIOUR Chairman: Graham Pierce

09:45-10:00 **Variation in the abundance of marine mammals during the different phases of construction of an offshore wind farm in the North Sea -** Emilie Praca

10:00-10:15 **The recent occurrence of humpback whales in the southern North Sea: a range expansion -** Mardik Leopold

10:15-10:30 **Early dolphin catches the fishing boat: behaviour- and time-specific social structure in bottlenose dolphins -** Tilen Genov

10:30-10:45 **Population genetic structure of Risso's dolphins (*Grampus griseus*) in the North Pacific based on mitochondrial and microsatellite DNA data** - Ing Chen

10:45-11:00 **Between monitoring strategies and European regulations: how evaluating cetacean conservation status?** - Helene Peltier

COFFEE BREAK – 11:00-11:30

WORKSHOPS REPORTS

11:30-12:30

LUNCH BREAK 12:30-14:00

SHORT TALK SESSION 3 – 14:00-15:00 Chairman: Kristina Lehnert

You can't tell the players without the program: factors affecting species success - Rianna Burnham

The place to be: gender differences in residency patterns of Risso's dolphins (*Grampus griseus*) in the Azores - Karin Hartman

Tidal influence on the occurrence of the harbour porpoise *Phocoena phocoena* in the Marsdiep area, The Netherlands - Lonneke IJsseldijk

Bottlenose dolphins (*Tursiops truncatus*) inhabit the former Cres-Lošinj Special Marine Reserve, Croatia? - Grgur Pleslić

I-Collect the new platform for a better marine mammal research - Aviad Scheinin

Cetacean in the Pelagos sanctuary: need for a multi-scale management approach - Paola Tepsich

Serological lungworm detection in seals – Sophia Arlena Ulrich

Brucella surveillance in stranded marine mammals from the south of the North Sea. Is the marine wildlife a potential reservoir of brucellosis for humans? Elena Alonso Velasco

Annual General Meeting
15:00-16:30

COFFEE BREAK 16:30-17:00

AWARDS (Students, Mandy McMath Conservation and Baleine Libre Video) AND CONFERENCE CLOSING
17:00-18:00

BANQUET 19:30-22:00
DANCING 22:00- 01:00 am
Société Littéraire de Liège, Place de la République Française, Liège
To enter, you must wear your ECS badge and bring your entrance ticket.

Keynote presentations:

Marine mammals and Good Environmental Status: Science, policy and society; challenges and opportunities

Pierce Graham, Peter Evans, Colin MacLeod, Andrew Brownlow, Emily Lambert, M. Begoña Santos

Oceanlab, University of Aberdeen

Current marine conservation policy developments in Europe have provided new impetus for marine mammal conservation. The EU's Marine Strategy Framework Directive is setting targets and proposing monitoring programmes and will shortly need to specify management options. The reform of the Common Fisheries Policy and the International Council for the Exploration of the Sea's new Science Plan both embrace "Integrated Ecosystem Assessment" (aka the Ecosystem Approach to Fisheries), which takes into account effects of fishing on the wider ecosystem (e.g. top predators). Integrated marine management and marine spatial planning will address spatial aspects of marine management; the need to prioritise different human activities creates the need for a common currency, e.g. through valuing Ecosystem Services.

Although we probably know the main threats (e.g. fishing, noise, habitat loss, pollution, climate change), except for a very few species, our current understanding of the status of European marine mammal populations is limited and current funding for monitoring, research and conservation is patchy. What then are the challenges and opportunities associated with the need to achieve "Good Environmental Status" for marine mammals in European Seas?

Since there is no realistic expectation of increased funding for monitoring, we will need to make better use of existing data sources, alone and in combination. Possible examples include using cetacean strandings data to obtain insights into population dynamics, and sightings data from projects, volunteers, NGOs, etc, to quantify habitat use, both presenting their own challenges (e.g. in relation to variability and bias in the data) and opportunities. Lessons can be learned from other taxa and other regions. There is also a need to re-evaluate current monitoring approaches.

Most conservation funding directed at marine mammals in European waters currently goes into evaluating population status, i.e. research and monitoring (which is where the science tends to be focussed). However, what management measures are available to us to protect declining species? The MSFD timetable implies that we will have the answers to this question by 2016. Fisheries science has already started to embrace Management Strategy Evaluation and the study of Governance Systems, explicitly recognising that the scientist's job does not end with the assessment of system status. This is multidisciplinary science, needing social scientists and economists as well as environmental scientists and modellers.

The evaluation needs to extend to the system itself: monitoring programmes must be adequate to detect important changes while monitoring targets need to be realistically achievable. Management measures must be relevant (e.g. spatial conservation measures) and the system on implementation fit for purpose. Legislation may need to be refined, a potential Pandora's box since it is vulnerable to lobbying from all kinds of vested interests. Thus (and even if this is goes beyond the role of science) conservation needs its voice to be heard – and to have public opinion on its side.

Finally, like all targets which imply new work (and new expenditure), conservation targets are vulnerable to erosion and revision, including the (sometimes) subtle and unconscious redefinition of terminology, so that the targets increasingly match the status quo: vigilance is needed to ensure conservation efforts are not reduced to a box-ticking exercise!

Northeastern Pacific killer whales on the edge: Pollution as a conservation threat

Ross Peter S.

Ocean Pollution Science Program Vancouver Aquarium

As the world's oceans get noisier, warmer and more polluted, humankind faces increasing pressures to refine scientific approaches in support of conservation planning for many cetaceans. Since our discovery that southern resident and transient (Bigg's) killer whales (Orcinus orca) in the NE Pacific Ocean are some of the most contaminated marine mammals in the world, we have characterized the source, transport, fate and effects of persistent organic pollutants in killer whales and other marine mammals in this region. However, our research is virtually meaningless when considered in isolation. Baseline ecological studies that provide supporting information on demographics, feeding ecology, seasonal habitat use and behavior have strengthened our ability to interpret contaminant and health assessments and contributed to our ability to help prioritize human threats to these endangered populations. Several lines of scientific research are contributing to government-mandated Action Plans aimed at protecting and recovering killer whale populations in Canada. Key challenges for scientists and conservationists include the long lives of killer whales (up to 100 years), their wide-ranging habitat use, their reliance on highly mobile prey species and their high trophic levels. The example of British Columbia's killer whales underscores the inherent vulnerability of these creatures to very heavy contamination by persistent organic pollutants including legacy chemicals (e.g. PCBs) and recent-use chemicals (e.g. PBDEs) that travel readily around the world through atmospheric transport, ocean currents, and biological vectors (migrating prey). Our prediction that PCB-related health risks will persist for these killer whales until the end of the 21st Century reminds us of the consequences of regulatory mistakes and highlights the need to consider lifespan, trophic level and habitat use for both predator and prey when considering chemical and waste management practices in the future.

How evaluating the health of marine mammals can benefit their management

Siebert Ursula

Institute for Terrestrial and Aquatic Wildlife Research (ITAW) of the University of Veterinary Medicine Hannover, Foundation, Germany.

Many different marine mammal species inhabit European waters. As top predators they are exposed to the effects of a wide range of anthropogenic influences and are treated as sentinel species for these marine ecosystems.
At the same time, a growing number of agreements (ASCOBANS, ACOBAMS, OSPAR, HELCOM, Natura 2000, MSFD) result in national and international activities for the protection and preservation of marine mammals.
The first seal die-off in the North Sea and adjacent waters in 1988/89 made clear just how little was known about the health status of marine mammals in this area. The European Cetacean Society was one of the first organisation in 1991 to coordinate health status assessments. Since then different stranding networks and an infrastructure for health assessment have been established along European coastal areas. Basic information on the occurrence of different lesions and the impact of microbiological, viral and parasitic diseases has been collected. Special focus has been placed on the understanding of, e.g., noise and chemical pollution on the auditory, immune, endocrine and reproductive systems. Mystery events such as mass strandings of beaked whales were detected and signs of decompression sickness were found. Traumatic findings in harbour porpoises and harbour seals were clarified and could be associated with attacks by bottlenose dolphins and grey seals.
Where are we today with our efforts to understand the health status of marine mammals? Are we ready to distinguish between natural and anthropogenic diseases? What is the “good health status” we need to preserve in marine mammals in European waters?

Oral presentations:

The slaughter of the Southwest Atlantic right whale by 19th century whalers: two decades for decimating the population and five to initiate recovery

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Logbooks from whaling expeditions provide an invaluable insight into whale density, abundance trends and population decimation processes. We extracted sighting and capture data from 264 whaling expeditions to the southwest Atlantic Ocean that took place during the period 1776-1923 to investigate temporal changes in the abundance of southern right whales (Eubalaena australis). In total, we compiled data from nearly 18,000 days of operation at the whaling grounds which rendered more than 2,000 sightings and nearly 500 captures of right whales. The whaling grounds extended from southern Brazil to the tip of Cape Horn, but showed clumps around Peninsula Valdés and the Falkland Islands especially in the early period of operation. Although data from the 18th century are fragmentary and probably underestimate catch levels, a substantial number of removals occurred during the period 1776-1800. Exploitation strengthened in the first decade of the 19th century and, as a consequence, the southern right whale population precipitated between 1810 and 1830. Thereafter, the species appeared to vanish from the area and only reappeared again in the 1880s, although the sighting per unit effort in this latter period was one order of magnitude lower than that at the beginning of the 19th century.

Research undertaken with the support of the Fundación BBVA

Highly specified lipid tissues of cetaceans: coupling GC and NMR HR-MAS studies unravels variations in biochemical compositions related to biological functions.

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Cetaceans possess a highly specific lipid metabolism among mammals. For instance, isovaleric acid (IVA), known to be toxic in other mammals, is strongly accumulated in two types of odontocete adipose tissues: blubber and melon. The biological functions of these accumulations are clearly tissue specific, most probably linked to sound conduction in the melon. The exact topography of these adipose tissues and the biological significance of their lipid composition remain unclear. We have used two complementary techniques to analyse these lipid compositions: one, classic, Gas Chromatography (GC), and another, more innovative, High Resolution Magic Angle Spinning (HR-MAS) Nuclear Magnetic Resonance (NMR) spectroscopy. Their results are in good accordance. The HR-MAS NMR which relies on the direct analysis of tissue samples allowed us to analyse more than 300 samples from 15 different species. GC completed these analyses by giving more detailed results. We obtained data for melon and blubber organs that reinforced the knowledge of stratification between inner and outer layers and the existence of marked differences between species. We established an informative and innovative comparative cartography of lipid composition in eleven melons, belonging to 5 species. The overall melon structure is well conserved, with a central melon characterized by high concentrations of long and short isobranched-chain fatty acids and wax esters, and an outer melon containing high concentrations of unsaturated fatty acids. The clear differences observed between species, in particular concerning isobranched-chain fatty acids, prompt us to hypothesize correlations between diving depth and lipid composition. We are now trying to precise the links between all these biochemical data and the biological functions of the organs, using medical imaging, MRI and ultrasonography, in order to better understand the sound transmission in the melon of odontocetes.

A new approach to estimate inter-birth interval in a bottlenose dolphin population

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The inter-birth interval (IBI) is an important measure of female reproductive success in many slow-reproducing mammals. Most cetacean studies report observational data, with very few attempts to model birth-interval probabilities, which require long-term individual data to provide the least biased type of information. We used sighting and reproductive histories from female bottlenose dolphins collected over 25 years off NE Scotland and Generalized Linear Mixed Models (GLMMs) to model the probability of birth as a function of the number of years since a prior birth (YSPB). Individual and temporal variability were accounted for as random effects. A mean IBI was estimated based on the predicted conditional birth-interval probabilities and the confidence interval (CI) was derived by bootstrapping. Data from 78 females which gave birth to 156 calves between 1987 and 2012 were analysed, with observed complete IBIs from 2 to 9 yrs (mean 3.75±1.42). The estimated mean IBI from the most supported model was 4.49 yrs (CI 3.94 - 4.93 yrs). To validate the analytical approach and investigate how incomplete datasets and different sighting probabilities affect the estimation of IBI we analysed simulated datasets comprising sighting and reproductive histories from over 600 hypothetical females. Each simulated dataset was projected 50 years using demographic and sighting parameters estimated for the study population and the conditional birth-interval probabilities from the most supported GLMM model. Mean IBI estimates from simulations were smaller by 2.8% on average, validating the analytical approach. Including incomplete datasets resulted in overestimated mean IBIs by 36% on average. Low sighting probabilities (≤ 0.3) either failed to provide enough data to run the models or resulted in substantially overestimated (10-44%) mean IBIs. The approach presented here can be modified to include other factors affecting birth probabilities and is applicable to other populations with comprehensive data on birth intervals.

Evidence of land-sea transfer of a zoonotic human pathogen, Campylobacter spp., to grey seals (*Halichoerus grypus*)

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Campylobacter is the primary cause of bacterial food poisoning in the UK. The majority of human infections are unexplained by recognised risk factors for disease and the ecology of this pathogen warrants further investigation. Grey seals (Halichoerus grypus) are potential sentinels of our coastal marine health. Determining which pathogens of potential anthropogenic origin are being carried by these animals is crucial to understanding the effects that humans have on the marine environment. Rectal swabs were taken from 50 dead and 90 live grey seal pups and 19 yearlings on a breeding colony along with full post-mortem examination of dead pups. Prevalence of Campylobacter was high in dead (24/50, 48%) and live (46/90, 51.1%) grey seal pups but no Campylobacter was detected in yearlings (0/19, 0%). Histopathological assessment of large intestine of dead pups demonstrated a correlation between the presence of Campylobacter in rectal swabs and the presence of moderate to severe colitis implying pathogenicity (p=0.02, Fisher's Exact Test) and thus energetic cost to the pups. Multi-locus sequence typing (MLST) typing, comparative full length DNA sequence genomics and source attribution of isolates were performed to elucidate the origin of these seal strains. Several C. jejuni and C. coli sequence types were identified (13 and 3 respectively), all of which are known to cause enteric disease in humans. Isolates formed several epidemic clones within the colony which may be indicative of a rapid colonisation and multiplication in a vacant niche. Phylogeny of C. jejuni and C. coli strains isolated from seals showed a striking clustering with agricultural Campylobacter, indicating very recent divergence from them. Finally source attribution analysis is strongly suggestive that humans, acting as an intermediate reservoir, represent a major source of Campylobacter infection for grey seals.

Sound production and behaviour of humpback whales (*Megaptera novaeangliae*) on feeding grounds in NE-Icelandic waters

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The humpback whale is a migratory species which possesses a complex sound repertoire. This ranges from simple non-song sounds, referred to as social sounds, to complex mating songs. Non-song sounds have been reported on their feeding and breeding grounds. There is a considerable lack of understanding about the role of these non-song sounds due to relatively few publications, especially from high latitude feeding grounds. The aim of this research is to gain better understanding on the role of these social sounds on a high latitude feeding ground. The sound behaviour was studied in relation to their visually observed behaviour, on summer feeding grounds in Skjalfandi Bay, NE-Iceland. Passive acoustic recordings and video recordings of surface behaviour were conducted simultaneously. The study periods were July - August 2012, and June – July 2013. A custom made hydrophone was used during the earlier period at a depth of 8.5 m, and a Reson hydrophone during the latter period at depths of 15 m and 20 m. The observation of each humpback whale, video commentary, whale ID from footage, and GPS of each sampling sequence, were combined to get a clear assessment of the behaviour of the observed whales. Each detected vocalization will be inspected visually and aurally, using a spectrogram in the Raven Pro sound analysis software. Statistics will be used to determine correct classification of vocalization types. All that combined has the purpose of getting synchronized behaviour and acoustic results, for sound associated behaviour.

Seals on holiday: Expansion of the Grey Seal Population in the Dutch Wadden Sea

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Grey seals are known to show a high level of site-fidelity from one breeding season to the next, however little is known about their travels between seasons. Counts in the Dutch Wadden Sea suggest that influx, both into the breeding population and as temporary visitors are at the basis of the 25 year's exponential growth in the area.
Thought observed as vagrants years before this, grey seals were first observed breeding in the area in 1985. The species had been exterminated in the Middle Ages. Counts of hauled out animals were carried out from 1985-2010 during three different periods of the seals' annual cycle; breeding season (November-January), molt season (March-April), and summer (May-September).
The development of the local breeding population was estimated using an age-structured population model fitted to pup counts. Pup numbers grew in this period to a maximum count of 344. This is compared to the survey results in the other seasons. For the data in summer, haul-out probability estimates derived from telemetry were used to correct the count data. Even in moult, where telemetry data is lacking we show that more animals (2,036 seals in 2010) are present in the area than would be expected from the pup numbers.
These findings are supported by the grey seals telemetry, and marking results showing individuals crossing the North Sea regularly. Further studies using for example Photo ID, and genetics should help understand in more detail the processes driving this recolonisation, Understanding the processes responsible, might provide advice on underlying extinction or recovery mechanisms.

Large-scale static acoustic survey of a low-density population – estimating the abundance of the Baltic Sea harbour porpoise

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SAMBAH (Static Acoustic Monitoring of the Baltic Sea Harbour Porpoise) is an EU LIFE+-funded project with the primary goal of estimating the abundance and distribution of the critically endangered Baltic Sea harbour porpoise. From May 2011 to April 2013, project members in all EU countries around the Baltic Sea undertook a static acoustic survey using approximately 300 porpoise detectors (C-PODs) distributed in a randomly positioned systematic grid in waters 5-80m deep. In the recorded data, click trains originating from porpoises have been identified automatically using an algorithm developed specifically for Baltic conditions. To determine the click train detection function of the C-POD, a series of experiments have been carried out within or in cooperation with SAMBAH; (1) acoustic tracking of wild free-ranging porpoises using hydrophone arrays in an area with moored C-PODs, (2) C-POD detections of wild porpoises swimming in pound nets, and (3) playbacks of porpoise-like signals at SAMBAH C-PODs during various hydrological conditions. The porpoise abundance has been estimated using multiple approaches to evaluate best practice. The approaches include cue-counting of porpoise clicks, and counting the number of groups detected in short time interval windows (snapshots). Auxiliary data needed for these calculations are echolocation rate investigated by attaching acoustic tags on wild porpoises, and group size obtained by spatial modelling of dedicated and opportunistic sightings. Abundance estimates for the whole study area and per country will be presented. The project is scheduled to finish in fall 2015, and further outputs include spatio-temporal density predictions throughout the surveyed region. SAMBAH aims to aid conservation efforts by providing abundance estimates, identifying important areas and areas with of high risk of conflict with anthropogenic activities, and increasing public awareness. It also aims to demonstrate best practice in cost-effective large-scale surveillance of a marine mammal that occurs at very low density.

Population genetic structure of Risso's dolphins (*Grampus griseus*) in the North Pacific based on mitochondrial and microsatellite DNA data

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Significant population structure is common for the small cetacean species found in the North Pacific, including many pelagic species (e.g., Pacific white-sided dolphin, common bottlenose dolphin, spinner dolphin and false killer whale). Various hypotheses including historic landmass barriers, resource use partitioning, social affinity, and reproductive isolation by geographic distance, have been proposed to explain the pattern of differentiation. In this study, we investigate another widely-distributed species, Risso's dolphin *Grampus griseus*, to test the relative support for those hypotheses in a monotypic, regionally predominant species. We generated genetic data from 15 microsatellite and 1 mitochondrial DNA markers in 240 Risso's dolphins sampled from both east and west coasts of the North Pacific Ocean. Our results revealed high levels of genetic diversity, large long-term effective population sizes and ongoing gene flow among studied sites. We also found evidence for population structure that was in some aspects more consistent with the distribution of major ocean currents in the North Pacific than with isolation by distance. We discuss the implications for understanding the evolution of diversity in this species, and for promoting effective conservation and management strategies.

Harbour porpoises in the Mediterranean Sea; survey confirms their presence in the northern Aegean

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Free-swimming harbour porpoises (Phocoena phocoena sp.) have not been documented in Mediterranean waters in over 20 years; in the same period, reported porpoise strandings throughout the Aegean Sea have increased, prompting theories of a relict population or immigration from the Black Sea. In summer 2013, the first dedicated, systematic survey for porpoises was conducted by IFAW, the Song of the Whale team and Pelagos Cetacean Research Institute, to investigate the presence, and if possible estimate distribution and density of harbour porpoises in the Thracian Sea, northern Aegean. During the visual and acoustic line transect survey, porpoises were sighted on nine occasions and detected acoustically sixteen times. Acoustic detections were made in three discrete areas: north of the Island of Thasos, Greece; west of the city of Alexandroupolis, Greece; and in Saros Bay, Turkey; sightings were confined to Saros Bay. Sighting conditions varied throughout the study area, however, porpoises were seen in Saros Bay on two occasions 14 days apart; during encounters animals were observed in small groups (of 1-4 individuals), including a mother-calf pair. This is the first account of live free-swimming harbour porpoises in the Aegean Sea since 1993 and the first ever report of live harbour porpoises in Turkish Aegean waters. It is not known whether Aegean porpoises originate from the endangered genetically-distinct Black Sea subspecies or are a remnant of a Mediterranean population. International efforts towards the conservation of porpoises in the Aegean Sea are urgently needed regardless of their genetic origins. This first systematic survey provides an initial baseline from which to continue efforts to monitor this little known population, and to focus future conservation actions.

Enhanced detection of harbour porpoises prior to ramming, seismic blasts and ammunition clearance using porpoise communication sounds

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Reliable detection of harbour porpoises within a wide and predetermined radius is of great importance prior to the onset of activities with intensive acoustic hazard such as pile-ramming, seismic exploration or ammunition clearance, to prevent auditive injury.
The German Hydrographic Service (BSH) has limited man-made emissions within 750 m of marine sound sources at 190 dB (peak to peak). However, during ramming of offshore windmill pile diameters above 1,5 m, sound exposure levels exceed these limits. Seismic arrays exceed 190 dB within 1 km and peak pressures during submarine explosions of 10 kg charges exceed this level even within a 15 km radius.
The passive acoustic detection probability of harbour porpoises is only 0.1 - 0.3 (T-POD), presumably due to discontinuous echolocation of the animals as well as to echolocation clicks not being focussed on the detector: porpoise signals are narrow-beam with an aperture of only 11-13° in the vertical and horizontal planes. Passive acoustic detection is therefore subject to chance. Most porpoises within hazard range may be undetected.
In the Little Belt, Denmark, we employed the novel and programmable Porpoise Alarm (PAL) to generate synthetic and stimulating harbour porpoise communication signals (SL 154db ± 2dB p-p re 1μPa at 1 m; 133 kHz ± 8,5kHz) to enhance porpoises to emit focused echolocation clicks. Porpoise "answer"-clicks were detected via CPOD and simultaneously by a purpose-built sonobuoy transmitting detections in real time. Porpoise surfacing positions were tracked via theodolite.
We investigated various signals and found one synthetic clicktrain which led to a significant increase in echolocation and repeatedly attracted the animals within hearing range (approx. 300 m) to the detector. This would significantly increase detection probability and enable operators to choose adequate strategies to ensure that the area is cleared prior to hazardous acoustic emissions.

Demonstrating robust Consistent Individual Differences in the vigilance behaviours of grey seals (*Halichoerus grypus*) during the breeding season: what more could we learn from a cross-context approach?

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Consistent Individual Differences (CIDs) (or animal personalities) have been shown to occur in a large number of species. This apparent ubiquity of personality across a wide spectrum of the animal kingdom indicates that CIDs are a fundamental evolutionary condition under strong or persistent selective pressure or is a product of constraints on plasticity that are widespread and, therefore, fundamental for our comprehension of evolution. We demonstrate CIDs in vigilance behaviours of adult grey seals within and between breeding seasons using both 'hands-on' (handling animal to obtain proxies of fitness) and 'hands-off' (purely observational) techniques. Across these studies we have shown that CIDs in these vigilance behaviours are robust and are not linked to fine-scale habitat features, maternal experience, site fidelity, pup sex, pup activity or reproductive or dominance-related covariates, and are unlikely to be a product of sensitisation or habituation. Furthermore, we have provided evidence to show that across disturbed and undisturbed situations, individual postpartum females can show a degree of behavioural plasticity. Specifically, females could be separated into two groups where: 1) the rate of vigilance over the two situations was maintained (referred to as 'proactive') or 2) the rate of vigilance markedly increased during the disturbed situation (referred to as 'reactive') whilst CIDs in behaviour still persisted within the group. Here we discuss the need to expand on these studies by looking to studies on other species where researchers have found that vigilance behaviours often correlate with other behaviours across contexts such as exploring territory and risk taking behaviours. The relevance of these findings in the context of, and application to, marine mammal species is discussed with reference to our studies and studies on non-marine mammal species. Particular emphasis will be placed on fitness, population dynamics and the implications for conservation and management practices.

Early dolphin catches the fishing boat: behaviour- and time-specific social structure in bottlenose dolphins

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Complex social structure is a prominent feature in several species of mammals, and plays an important role in population dynamics and behavioural patterns in cetaceans. Understanding social structure is not only interesting and important in a purely biological sense, by helping us gain insights into the evolution and maintenance of sociality, but may also help conservation and management efforts, especially with respect to different actions targeted at different segments of the same population. This is important because not all segments of a population necessarily interact with human activities in same ways or at the same time. Social network analysis allows groups of social animals to be studied as a network of nodes and ties. When this is coupled with information on behaviour and interactions with human activities, it represents a powerful tool in the study and conservation of social animals. In this study, we examined the social structure of common bottlenose dolphins (*Tursiops truncatus*) in the northern Adriatic Sea, using social network metrics and association indices. We used nine years of photo-identification data (2003–2011) of 38 individuals sighted ≥ 4 times and in ≥ 2 different years. We calculated association patterns and standard lagged association rates, using the half-weight index of associations and permutation tests within the program SOCPROG 2.4. Network analyses and visualisations were done in program NetDraw 2.123. We show that 1) the local bottlenose dolphin population is structured into distinct social clusters or communities; 2) that the two largest clusters overlap spatially, but not temporally (segregation being based on time of day rather than season); and 3) that the two clusters differ in ways they interact with fisheries (“trawler” vs. “non-trawler” dolphins). This study demonstrates how different segments of animal populations can have different effects on human activities and in turn respond differently to anthropogenic impacts.

Small cetacean habitats around the largest sandbank in the offshore North Sea – The Dogger Bank revisited

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Little is known about the distribution of small cetaceans in the offshore areas of the North Sea. However, information on abundance and distribution is essential to assess the impact of climate change and other anthropogenic stressors, to infer on the species conservation status and to identify areas of high ecological importance. We conducted aerial line transect surveys for small cetaceans in the summers of 2011 and 2013 of the Dogger Bank and adjacent areas, in a study area of 66,800 km2 (UK, NL, DK, GE waters). Following the same survey design the realised survey effort was slightly higher in 2011 than in 2013 (5,997 km vs. 5,629 km). The harbour porpoise sighting rate in 2011 was clearly higher than in 2013 (711 sightings vs. 427 sightings) and also the estimated density in the entire study area was significantly higher in 2011 (1.82 ind./km2, CV=0.30 vs. 0.68 ind./km2, CV=0.31). We also recorded a low number of minke whale and white-beaked dolphin sightings. In both years, we found low porpoise densities on the central Dogger Bank and high densities on the slopes of the sandbank, mainly in the western and south-western strata. We hypothesise that the high biological production level at the slopes, due to good mixing of water masses and upwelling of nutrients, attracts top predators. We present spatial models linking this unique data set to fisheries data and physical and biological ocean properties that might serve as proxies for prey abundance and could, thus, provide environmental cues for harbour porpoises to locate rich food sources. We infer on reasons why the density has been halved in 2013, a year characterised by high sea surface temperatures in the area. We show that repeated surveys combined with spatial modelling provide insights in explaining distribution and abundance patterns.

Genetic vs. Ecological Management Units: What time-scale is relevant for managing threats?

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Identifying discrete, demographically independent, conservation units is essential for the conservation of wildlife populations. However, there is a lack of general agreement on the most appropriate way to determine population structure. Here we use a combination of photo-identification, as well as both ecological and genetic markers as a multi-disciplinary approach to define the conservation units of bottlenose dolphins in southern Spain.
Bottlenose dolphins are distributed both in the Gulf of Cadiz and the adjacent Strait of Gibraltar. Photo-identification pictures have been taken since 2001 in the region. Biopsy samples were analysed for genetic markers (27 microsatellites), stable isotopes (δ15N and δ13C) and contaminant loads (PBDEs, MeO-BDEs and Dechloranes).
Photo-identification showed long-term residency of bottlenose dolphins in the region, but no recaptures between the areas, suggesting a spatial segregation. While genetic analysis based on bayesian clustering and Fst values show no significant differentiation.
Stable isotope analysis revealed that the two areas have significant different signatures both for nitrogen ($F=8.98$, $p<0.01$) and carbon ($F=5.14$, $p<0.05$). Moreover, standard ellipses showed only a 9.11% of overlap between areas, indicating different diet or foraging on same preys but with different baselines. Regarding contaminants, significant statistical differences were found for some congeners. Classical multidimensional scaling and standard ellipses were applied to the different types showing very low overlap for PBDEs (9.33%) and dechloranes (0.51%) and a complete inclusion for MeO-BDEs.
These results suggest that bottlenose dolphins from both areas, although genetically indistinguishable, belong to distinct ecological management units and will need different conservation measures to manage the different threats that are facing. This new information is critical for the Spanish government. Indeed the species is listed in the Annex II of the EU's Habitats Directive and therefore requires the creation of Special Areas of Conservation (SACs) and the implementation of management plan in each SAC.

Can the junk food hypothesis be applied to harbour porpoises (*Phocoena phocoena*) in Dutch waters ?

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Porpoise distribution in the North Sea has shifted southwards in recent years. Apparently, many animals left areas that are rich in sandeels *Ammodytes sp.* and moved to an area where much leaner gobies *Pomatoschistus sp.* and whiting *Merlangius merlangus* are their main prey. This shift in range, and presumably in diet, does not seem to have affected the body condition of all porpoises in the south. Body condition in stranded specimen found in the Netherlands varies, from very good to very poor. Still, the most likely cause of death of some 15% of these stranded animals is starvation. The question thus arises whether these animals could not find sufficient food or if their food was of insufficient quality. Stomachs of emaciated animals are not necessarily empty. In fact, stomachs of emaciated porpoises were often found to contain food remains. This study examines these remains and compares the diet of emaciated porpoises to that of healthy specimen. We hypothesise that porpoises might starve by eating junk food: other, leaner prey than they should be taking in order to maintain a good body condition. Results show that there is a highly significant difference in diet between animals in a good body condition and animals in a bad body condition (PERMANVOVA; df = 1; p = 0.001). Co-variables that show significance in relation to total prey mass per individual are season (PERMANVOVA; df = 3; p = 0.001) and age (PERMANVOVA; df = 2; p = 0.001). Our findings can provide that animals in a bad body condition tend to feed on leaner fish than the individuals in a good body condition.

Effectiveness of real-time detection of harbour porpoises

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Pile driving noise emitted during offshore wind farm construction has the potential to harm marine mammals. In order to avoid potential injury to these animals besides the application of noise mitigation methods such as acoustic deterrent (pingers) and harassment devices (seal scarer) prior to pile driving, it is mandatory in German waters to ensure that all animals have left the area within which noise levels may be high enough to cause injury.
A new passive acoustic monitoring technique, the Seiche 'Wireless Detection System' (WDS) is used to verify a successful deterrence of harbour porpoises (Phocoena phocoena) in real-time. It furthermore enables immediate mitigation action if necessary. The detection system consists of an autonomous network of buoys deployed around the pile driving location. Each buoy is equipped with a broadband hydrophone, GPS and radio telemetry. The receiving and processing station is located on a dedicated vessel and the buoys can be turned on and off remotely. The software PAMGUARD displays the characterization by using spectrograms, bearing patterns and high/low frequency to classify a candidate porpoise echolocation.
To ensure successful deterrence of animals within a defined zone it is crucial to know the probability of detection for harbour porpoise by the WDS buoy. We therefore tracked porpoises visually with a geopositioned theodolite from a cliff 20 m above sea level. The tracks of surfacing porpoises were compared with the acoustic detection rate. Knowing the distance of the detected animal from the WDS buoy and its heading angle, a detection function was calculated. The detection function of the WDS determines the deployment design of the WDS buoy network around pile driving operations.

Coda repertoires and social structure of sperm whales (*Physeter macrocephalus*) in the western Indian Ocean

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Sperm whales (Physeter macrocephalus) are cosmopolitan odontocetes with a complex social structure. Adult females and juveniles live in small, long-term social units that can have their own vocal repertoire, based on coda type usage frequency. Codas are short, stereotyped click sequences that are thought to be used for communication. Units with similar repertoires can be assigned to the same vocal clan. The aim of this study was to describe the different coda types produced by sperm whales in Mauritius in the western Indian Ocean, and to compare the coda repertoires between groups in that region to investigate the presence of different vocal clans. In the period 2008-2013, 6 boat-based surveys using a towed hydrophone were conducted off the Mauritian west coast. Whenever sperm whales were encountered, their vocalizations were recorded and their flukes photographed to establish a photo-ID catalogue. About 100 different individuals were identified, most of which could be assigned to one of 10 different social units. Around 5300 codas were extracted from the sound recordings and analyzed. Coda lengths generally ranged from 2 to 12 clicks, with 8-click codas being the most common. Codas were divided into types with k-means clustering based on total number of clicks and inter-click interval (ICI), the time between the onsets of 2 consecutive clicks. About 30 different coda types were found, none of which unique to a unit. Repertoires were compared between social units using multivariate similarity measures. The results showed considerable repertoire overlap between the units included in the analysis, suggesting the presence of only one vocal clan in this specific area. To further evaluate the existence of multiple vocal clans in the western Indian Ocean, future acoustic surveys should cover a more extensive area.

Role of bottlenose dolphins and other top predators in linking ecosystem dynamics in the Florida Everglades

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Marine mammals feed at a variety of trophic levels and occur from freshwater to open-ocean ecosystems of all latitudes. Due to their abundance, large scale movements and high metabolic rates, they have a strong potential to affect the structure and function of ecosystems. Behavior may also shape their ecological roles, including those of translocating nutrients among ecosystems and linking the dynamics of spatially distinct food webs through the use of multiple habitats within and across ecosystem boundaries. Such dynamics may be especially important in nutrient-limited systems. The Shark River Estuary, Florida, is an oligotrophic ecosystem that stretches from the Gulf of Mexico to freshwater marshes, and provides habitat for a variety of large aquatic predators, including bottlenose dolphins (Tursiops truncatus), American alligators (Alligator mississippiensis) and bull sharks (Carcharhinus leucas). Through our research using a variety of sampling techniques, including photo identification, stable isotope analysis, acoustic and GPS tracking, we have found that habitat use of bottlenose dolphins, bull sharks and alligators extends throughout estuary. In addition, stable carbon and nitrogen isotope analyses have shown they feed on prey from multiple food webs. As such, these large and mobile predators serve as mobile links between marine, brackish, and freshwater areas of the estuary, and their respective food webs. The spatial and temporal scales over which each predator population connects these food webs and impacts recipient habitats, however varies among species and individuals within species, suggesting each population has a unique role within the ecosystem. The decline of large aquatic vertebrates, such as marine mammals and sharks, and the introduction of disturbances leading to shifts of habitat use (e.g. habitat modification, acoustic pollution, climate change) may affect the role of these predators that could cascade to multiple ecosystems.

Gastrointestinal parasites of free-living Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) in the Northern Red Sea, Egypt

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The present study represents the first report on the gastrointestinal parasite fauna infecting the free-living and alive Indo-Pacific bottlenose dolphins (Tursiops aduncus) inhabiting waters of the Red Sea at Hurghada, Egypt. A total of 94 individual faecal samples of the examined bottlenose dolphins were collected during several diving expeditions within their natural habitats. Using classical parasitological techniques, such as SAF-method, carbol-fuchsin stained faecal smears, coproantigen-ELISA, PCR and macroscopical analyses were applied, the study revealed infections with 21 different parasite species belonging to protozoans and metazoans with some of them bearing zoonotic potential. In detail the study indicate stages of ten protozoan species (Giardia spp., Sarcocystis spp., Isospora (like) spp., Cystoisospora (like) spp., Ciliata indet. I, II, Holotricha indet. Dinoflagellata indet., Hexamita (like) spp., Cryptosporidium spp.), seven trematode species (Nasitrema attenuata, Nasitrema sp. I, II, Zalophotrema curilensis, Zalophotrema spp., Pholeter gastrophilus, Trematoda indet.), one cestode species (Diphyllobothrium spp.), two nematode species (Ascaridida indet, Capillaria spp.) and one crustacean parasite (Cymothoidae indet.). Additionally we molecularly identified adult worms of Anisakis typica in individual dolphin vomitus samples by molecular analyses. Overall, these parasitological findings include ten new host records for T. aduncus, (i. e. in case of Giardia spp., Sarcocystis spp., Cryptosporidium spp., Nasitrema spp., Zalophotrema spp., Pholeter gastrophilus, Anisakis typica, Capillaria spp., Diphyllobothrium spp. and Cymothoidae indet.). The present results may be used as a baseline for future monitoring studies targeting the impact of climate or other environmental changes on dolphin's health conditions and therefore contribute to the protection of these fascinating marine mammals.

Spatio-Temporal Distribution Patterns of Harbour Porpoise (*Phocoena phocoena*) Calves in German Waters

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While the harbour porpoise distribution in German waters has been thoroughly assessed by aerial monitoring programs, little attention has been given to calf distributions. These could add substantially to the understanding of habitat use and reproduction patterns of porpoises and should be included in management plans and protection measures.
Aerial survey monitoring based on line transect distance sampling methodology was conducted in German waters between 2002 and 2012 and provided porpoise as well as calf sighting data. Moreover, porpoise carcasses stranded along the coasts of Schleswig-Holstein and Mecklenburg-Vorpommern were collected between 1990 and 2012. Data sets were analysed with respect to spatio-temporal distribution patterns of porpoises and calves.
Seasonal patterns for calf densities were detected unravelling typical annual peaks in June in the North Sea and in July in the Baltic Sea, while peak stranding numbers were shifted backwards by one month respectively. While highest calf densities were found in the North-West of the German North Sea waters in spring, a clear hotspot for calves was found in summer in the North-East, at Sylt Outer Reef, leading to the conclusion that mother-calf pairs might perform seasonal migrations. Calf densities revealed the emerging importance of the area Borkum Reef Ground as a hotspot with increasing densities over the years. In the Baltic Sea, regions around Fehmarn and along the coastline of Mecklenburg-Vorpommern, north-east of Rostock showed highest calf numbers.
Since distinct areas and seasons of importance could be identified, we suggest spatio-temporal distribution patterns of harbour porpoise calves to be considered in management actions concerning possible interferences with anthropogenic pressures, like fisheries and the construction of offshore wind farms. Potential migration paths of mother-calf pairs need to be taken into consideration. Particularly high protection is needed during main calving periods in the identified hotspot regions of harbour porpoise calves.

Preliminary estimates of cetaceans abundance in the French EEZ

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Two dedicated aerial surveys were carried out over the entire French Exclusive Economic Zone waters, and extended areas (English Channel, Spanish waters of the Bay of Biscay and Italian part of the PELAGOS Sanctuary). A total effort of 46300 km was covered in winter 2011-12 and 52 300km in summer 2012 using the same sampling design. Most of the effort was conducted with Beaufort sea state 3 or less (87% in winter and 92% in summer). Analyses were carried out with Distance Sampling, allowing to model seasonal detection function for striped and common dolphins, harbour porpoises and bottlenose dolphins, while both seasons were pooled for Risso's dolphins, pilot whales and fin whales. Estimations were corrected to account for availability bias of each taxonomic group. Seasonal densities of porpoises revealed a stable value for the Channel (≈0.30 ind.km-2, CV=0.14-0.21) with a clear preference for French coastal area in winter. Within the Bay of Biscay the number of animals estimated was multiplied by four in summer reaching about 20 000 individuals in summer (CI: 13 400 -30 000). For striped and common dolphins, an increase of the group size occurred between winter and summer, in the three sectors (Channel, Biscay, Mediterranean), with a summer density multiplied by two in Mediterranean Sea. Bathymetric affinity of this group was reversed between seasons in the Bay of Biscay, with a higher density in the shelf stratum in winter and in the slope and oceanic strata in summer. Densities of bottlenose dolphins could be classified in two levels, around 0.01 ind.km-2 for minimum values in Channel, Atlantic shelf strata or Mediterranean in summer or around 0.06 ind.km-2 for Atlantic slope stratum or Mediterranean in winter. These results allow for the first time to estimate cetacean's abundance within all the French EEZ, and quantify their seasonal variation.

Xenobiotic molecular biomarkers in harbour seals as proxies for pollutant burden and effects?

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Harbour seals as top predators and indicators for ecosystem health are exposed to increasing pressure caused by anthropogenic activities in their marine environment. Persistent organic pollutants (POPs) are hazardous contaminants which accumulate in liver and blood of marine mammals such as harbour seals. POPs can negatively affect the immune system and have been reported to increase susceptibility to viral infections in seals. Biomarkers of the xenobiotic metabolism (AHR, ARNT, PPARalpha) and cytokines (IL2, IL10) and heat shock protein (HSP70) as cell mediators of the immune system were established to evaluate the impact of environmental stressors on harbour seals.
Harbour seals (n=54) were captured on sandbanks in the North Sea during 2009 to 2012. Medicals including haematology were performed, RNAlater blood samples were taken before their release and analysed using RT-qPCR (housekeeping genes YWHAZ, ß2M, ß-actin). mRNA transcription of six biomarkers was analysed and transcript copy numbers were correlated to haematology and POP burden in blood.
A significant correlation between xenobiotic markers AHR and ARNT, cytokine IL2 and contaminant burden was found. PERMANOVAS (Permutational Multivariate Analysis of Variance) based on NMDS (non-metric multi-dimensional scaling) analysis showed significant interrelationships between AHR, ARNT, IL2 and POP compounds, as well as with sex, weight and liver haematology values, indicating the xenobiotic biomarkers to reflect pollutant exposure, an accumulation of contaminants with age, lower burdens in adult females and the liver affected by xenobiotic metabolites. A significant relationship between cortisol levels and HSP70 expression was observed, indicating that HSP70 shows stress experienced during restraint of the seals. The xenobiotic markers prove to be an important non-invasive tool that reflects contaminant exposure and the impact of anthropogenic stressors in seal species. The connection between proinflammatory cytokine IL2, xenobiotic markers and pollutants may indicate immune suppression in animals exposed to contaminants with subsequent susceptibility to inflammatory disease.

The recent occurrence of humpback whales in the southern North Sea: a range expansion

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Humpback whales Megaptera novaeangliae have long migrations between high-latitude summer feeding grounds and tropical breeding grounds, and occur in most seas and all oceans. Even so, with only four known historic strandings (1751-1839) the species never lived in the southern North Sea. This changed dramatically in the 21st century. On 21 March 2001, the live stranding of an emaciated humpback whale at Pegwell, Kent constituted the first case on the English east coast in over 150 years (Jepson 2005). On 29 September 2003, the first ever (dead) humpback whale for The Netherlands was found floating at sea. What seemed to be accidental and extremely rare records at the time, appeared to have been (two of) the first of a series of strandings and sightings in the Southern Bight in subsequent years. One individual travelled back and forth between The Netherlands and Ireland in 2007; the first humpback whale having been tracked within European waters. Currently, humpback whales are annual visitors in the Southern North Sea and up to five or six individuals may occur in the area simultaneously. Adults, immatures and calves are all involved and a link with the population frequenting the Approaches to the English Channel has been established. Off The Netherlands, humpback whales have been noted to feed in coastal waters that are rich in sprat Sprattus sprattus, and remains of sprats were found in the last whale that stranded on Dutch shores. The current range expansion of humpbacks may be linked to a recovering Atlantic population, new exploratory behaviour and good feeding conditions in the southern North Sea.

Assessing Temporal and Spatial Trends in PCBs and DDTs in odontocetes since 1980

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Persistent organic pollutants such as polychlorinated biphenyls (PCBs) and dichlorodiphenyltrichloroethane (DDT) were used intensively within industrial and agricultural operations before 1970, and have been linked to considerable impacts in the marine environment due to trophic bioaccumulation. Subsequent health issues within top predators such as marine mammals have been well documented. This meta-analysis utilised odontocete cetaceans as bioindicators to assess global and regional trends in these contaminants since 1980, and assess the continued potential for industry and agriculture to effect compound loads within these species now that these compounds have been largely banned by the global community. Using published data, spatial and temporal trends were examined. Contaminant levels present in odontocete tissues were also compared with indicators of industrial and agricultural production to determine whether relationships still existed after 1990. Globally, a significant decline was found in PCB levels since 1980, although this was not reflected at regional levels, which showed high degrees of variability. There was no significant global trend in DDT levels, with few significant regional trends. No association was observed between agriculture or industry and contaminant levels since 1990, implying a reduction in the use of these contaminants, combined with active transport, has lead to a more ubiquitous spread of these compounds as opposed to areas of high point-source pollution. Significantly higher levels of DDT were found in cetaceans when comparing countries where malaria is endemic with those where it is not, suggesting that the persistent use of DDT as a form of mosquito control may continue to impact cetaceans in coastal regions. These results suggest that despite minimising their usage, significant declines of these contaminants in the environment are not yet forthcoming. This poses management questions for the continued usage of compounds with similar structures within industry, and their potential for long-term impacts on the environment.

Pre-consent monitoring as part of an Environmental Impact Assessment at the Atlantic Marine Energy Test Site (AMETS) off Co. Mayo, Ireland.

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The impact of marine renewable energy devices (MRED) on marine mammals is not known. As all marine mammals are protected by National, European and or International legislation, consideration should be given as to how marine renewable energy development could disturb or injure these species. Monitoring at Wave Energy Centres (WEC) can be divided into two different stages: (i) pre-consent monitoring as part of the Environmental Impact Assessment (EIA); or (ii) post-consent impact monitoring to evaluate the assumptions of the EIA and the effectiveness of any mitigation measures. Between 2009 and 2010 a baseline survey through routine dedicated visual surveys and Static Acoustic Monitoring (SAM) using C-PODs was carried out at the Wave Energy Test Site (WETS) (know the Atlantic Marine Energy Test Site – AMETS) off the Co. Mayo coast, on the west coast of Ireland. Monitoring at the site continued into 2011 and 2012. Following this extensive fieldwork at the Wave Energy Test Site, the diversity of marine mammals in the area was acknowledged. Common dolphin (Delphinus delphis) and harbour porpoise (Phocoena phocoena) occurred throughout the year with a peak in common dolphins in the autumn and winter. Bottlenose dolphins (Tursiops truncatus) were shown to use the site during summer and autumn and photo-identification suggested both the inshore coastal and the putative offshore population used the site which is unique to this area. The survey area was divided into two regions, offshore and mid-shore and extensive static acoustic monitoring using C-PODs, demonstrated a peak in detections at the outer berth compared to control sites. This work provides some baseline reference values with which to monitor any changes in use at the site which could be associated with MRED.

Between monitoring strategies and European regulations: how evaluating cetacean conservation status?

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In European waters death in fishing gears is the most important threat on delphinid populations. Common dolphin is the most abundant species in the Bay of Biscay and probably one of the most impacted by fishery activities. In order to evaluate cetacean bycatch rates in fisheries, the EU regulation CE812/2004 imposes the presence of qualified observers on fishing boats.
The aim of present study is to compare tools available for monitoring strategies to estimate by-caught cetacean numbers with the case of common dolphins, and how fishery practices hindered the application of CE812/2004 regulation. In this context, what are the environmental consequences of common dolphin by-catch?
The CE812/2004 regulation imposes qualified observers on fishing boats in order to monitor 5% of >15 meter boat fishing effort. Sampling scheme is defined but observers depend on fisherman volunteering. Bycatch estimations extrapolated from fishing effort varied from 0 in 2006 to 1 000 common dolphins in 2009 (mean = 322, SE= 412.4).
The French and UK Stranding Networks ensure the systematic collection and analysis of marine mammal stranding data. Back-trajectories of dead common dolphins found stranded between 1990 and 2009 during multiple stranding events were predicted to estimate their likely origin of mortality at sea. Corrected by stranding probability at sea and probability of being buoyant, these results suggested that 3 200 to 4 500 common dolphins would die in fishing gears every year.
The sampling scheme of the CE812/2004 is based on only 5% of selected fleet and reveals high spatial heterogeneity. Moreover, some European fleet fishing in the Bay of Biscay do not provide bycatch estimations. Therefore EU estimations are probably underestimated because of administrative and field constraints. Strength and weakness of both approaches will be discussed, and their consequences for the conservation of common dolphin populations will be considered.

Acoustically derived growth-rates of male sperm whales (*Physeter macrocephalus*) in the NW Mediterranean Sea

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Knowledge of body size and growth-rate is crucial to understand species' macroecology. Although sperm whales' length can be estimated using different techniques, to date they were not implemented for enough long time to gather knowledge on growth. Here, we present acoustically derived male sperm whale annual growth-rates for the North-Western Mediterranean Sea. Audio recordings were used to estimate the length and growth of 16 individuals repeatedly recorded and photographically recaptured between 2005 and 2013 in the Ligurian Sea. Using documented relationships between the Inter Pulse Interval (IPI) and total length, the growth-rate was estimated for those animals measured at least twice, more than six months apart. IPI was automatically computed via cepstral analysis using an *ad hoc* plug-in developed for the PAMGUARD software. Length and annual growth ranged between 11.14 and 13.12 m (mean= 12.36 m) and 0.00 and 0.28 my-1 (mean= 0.09 my-1), respectively. As expected, all whales showed an increasing or stable IPI over time with the annual growth decreasing as the body length increased. Based on the current knowledge, we assumed all animals to be males. While our length estimates agree with previously published data from the same area, little knowledge exists on growth-rate for the Mediterranean Sea. Nonetheless, no differences in the growth-rate with other populations outside the Basin were found (Kolmogorov-Smirnov test: D = 0.2604, p-value = 0.5948). This study is the first example on the use of non-invasive and non-lethal tools to investigate the growth of sperm whales in the Mediterranean, where the species classifies as '*Endangered*' according to the IUCN criteria. Body size and growth can be used to summarise diverse biological information and can be affected by many factors including anthropogenic activities; understanding their role can be essential to manage potential detrimental stressors and implement proper conservation measures.

Assessing the effect of boat traffic on bottlenose dolphin foraging activity using passive acoustic techniques

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Anthropogenic activities can interfere with animals' foraging activity. This can in turn affect an animal's energy balance, with potential consequences on its vital rates. We used acoustic techniques to quantify boat disturbance on bottlenose dolphin foraging activity, while accounting for boat noise masking the detection of foraging vocalisations. We deployed SM2M recorders (www.wildlifeacoustics.com) in two locations of the Moray Firth (Scotland) used by dolphins for foraging. The total continuous recording time was 65 (2012) and 52 days (2013). In 2013, acoustic data were paired with visual scan-sampling from land. We used PAMGuard software with a custom click classifier to detect and classify dolphin clicks. We then calculated inter-click intervals of detected clicks and used a mixture model to identify foraging buzzes. Acoustic data were analysed to characterise natural and anthropogenic noise, and a ship-detection algorithm was used to identify boat passages. The occurrence of foraging buzzes was modelled as a function of boat presence, as well as broadband noise, location, year, day and (during visual sampling) type and number of boats. Because boat noise masks the detection of buzzes, we estimated the relationship between detection probability and noise level. We developed a novel procedure by which recorded boat noise at varying levels was overlain on dolphin recordings to quantify the reduction in detections. We found that the 1/3 octave band centred on 1250 Hz yielded a consistent relationship between detection probability and noise level irrespective of boat type, and used this relationship as an observation model in a Bayesian hierarchical modelling framework. Our results indicate that boat presence was associated with a reduction in dolphin foraging activity. The visual samples suggest that this effect increased for increasing number of boats present. This is the first time that the effect of boat disturbance on dolphin foraging activity has been robustly quantified.

Molecular Diet Analysis of Grey Seals (*Halichoerus grypus*) and Harbour Seals (*Phoca vitulina*)

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Decades of successful conservation and management have led to substantial increases in European seal abundance. In some regions, this increase has resulted in renewed conflicts with the fisheries. Previous diet analyses on grey seals (Halichoerus grypus) and harbor seals (Phoca vitulina) have relied on identification of otoliths from stomach content and scats. However, seals often consume only the body of fish already caught in fishing equipment, resulting in very few otoliths found in scats and large monetary losses for the fisheries. As part of a larger project investigating the impact of grey and harbor seals on the Baltic and North Sea fisheries, this study uses Next-Generation Sequencing techniques to determine the fish component of the grey and harbor seal diet and provides a solid foundation for future decision-making. Seal scat samples were collected from several localities in the Baltic Sea, the Wadden Sea and Kattegat over several seasons. First, each scat was sequenced to identify seal species. Then, three sub-sampling methods were used to determine the optimal way of obtaining good quality, un-inhibited prey species DNA. Finally, general fish primers targeting the 16S region of the mitochondrion were used along with the Ion Torrent sequencing technique to obtain thousands of DNA sequences from each scat sample used to identify piscine prey species. Preliminary results show that major components of the seal diet are Atlantic cod (Gadus morhua) and herring (Culpea harengus) in the southwestern Baltic Sea. A previously unreported prey species, the lumpfish (Cyclopteridae lumpus), has been found as part of the diet of grey seals in Kattegat. This study confirms previous reports of fish prey species based on otolith identification, allows for evaluation and comparison of non-invasive otolith- and DNA-based diet analyses and adds a new prey species to the diet of grey seals.

Variation in the abundance of marine mammals during the different phases of construction of an offshore wind farm in the North Sea

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The rapid extension of offshore wind farms (OWF) in European marine habitats has raised concerns about their potential impact on marine mammals. Potential effects of OWF development on marine mammals are related to noise mainly during pile-driving, to vessel activity and also to alteration of their habitat by the structures. Variation in the abundance of harbour porpoise *Phocoena phocoena*, grey *Halichoerus grypus* and harbour *Phoca vitulina* seals was investigated at a recently commissioned site, Sheringham Shoal OWF (UK), in order to better understand how marine mammals react to construction. Separation of the different phases of construction through time allowed the respective effects of the different phases to be evaluated. Boat-based surveys of the wind farm site, 2 km and 4 km buffers and a control area were undertaken over six years, providing baseline (2005-06), pre-construction (2009-10), during (2010-13) and post-construction (2013) data. The variability in species abundance was assessed using generalised additive mixed models, with Julian day, monitoring year and location (e.g. 2 km buffer) as explanatory variables. Harbour porpoise showed the strongest response by decreasing in abundance during periods of foundation piling and also during the construction of the turbines. However, this species appeared to completely recover during the post-construction year. Harbour seals were less abundant during the first year of construction, when piling started and then increased in subsequent years. In contrast, grey seal abundance increased year-on-year in all study locations. All species were more abundant after construction compared to baseline and pre-construction periods. This could point toward the structures acting as artificial reefs, harbouring the fish prey of all species and thus having an indirect beneficial effect on marine mammals during the operational life of a wind farm.

Harbour porpoise life history, diet and fisheries interactions in two regions of the Northeast Atlantic: Scotland (UK) and the north-west Iberian Peninsula

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Harbour porpoises (Phocoena phocoena) in the north-west Iberian Peninsula (NWIP) (Galicia and northern Portugal) form a genetically isolated population of around 2600 individuals, for which there is little information on life history and ecology. The NWIP is an important fishing area and 50% of stranded porpoises show evidence of fishery by-catch. In contrast, porpoises in Scotland form part of a wide-ranging NE Atlantic population but locally the biggest causes of mortality are bottlenose dolphin kills and pathological conditions. Life history and diet analyses were conducted on stranded porpoises from both areas (1990-2010 in the NWIP, 1992-2010 in Scotland). Age, maturity and pregnancy data were used to construct life tables and estimate overall annual mortality and reproductive rates. Porpoises reached sexual maturity at around 4-5 years old in both sexes of both populations, but are larger but shorter-lived in the NWIP. Estimated annual pregnancy rate in mature females from NWIP was 0.53 (calving interval 1.89 years) compared to 0.34 in Scotland, although downward biases are likely. Life table results indicate annual population mortality rates of around 18% in both populations. Combined with cause of death data this implies that 11% of the NWIP population dies annually due to by-catch, which is most likely unsustainable. Main prey in NWIP were Trisopterus spp., blue whiting (Micromesistius poutassou) and Trachurus spp., as compared to whiting (Merlangius merlangus) and sandeels (Ammodytidae) in Scotland; all are species of commercial fishery importance. There were significant seasonal patterns in diet and larger porpoises ate larger prey. Significant interannual variation was detected in porpoise diet and mortality rates in Scotland but not in the NWIP, possibly reflecting smaller sample sizes in the latter area. Although the mortality rates are similar, the high bycatch rate and small population size suggests an urgent need for new conservation measures in the NWIP.

Population Viability Analysis of Mediterranean Monk seal (*Monachus Monachus*) and significance of dispersal in survival (Northeast Mediterranean Sea)

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Being host to one of the last and continuously breeding populations of Mediterranean monk seal, a part of North-eastern Mediterranean Sea was set aside for the conservation in1999 and declining trend in the size of the seal colony has been reversed. This study investigates recovery of monk seal population in the area. The field study involves deployment of photo-traps in XX caves along NE Mediterranean coast from Kaş to Turkish/Syrian border and the Northern Cyprus. Based on seal activities observed by photo-traps, the seal distribution map of monk seals in NE Mediterranean was updated. The photos were used to age and identify seals. The changes in demographic structure over the last 20 years were used to estimate population parameters, such as fecundity and mortality. The estimates were then used to run a PVA model (VORTEX; Lacy et al., 2009) and three different scenarios were tested; i) simulation of pre-conservation period; ii) simulation of post-conservation period assuming absolute isolation; and iii) simulation of post-conservation period allowing dispersal of individuals within a metapopulation. Results verified the positive impact of conservation measures applied on the recovery. Although the risk of extinction in the post-recovery phase decreased to a certain extent, the survival of the population has not been ensured due to skewed sex ratio and high sub-adult female mortality. It is observed that dispersal of individuals among neighbouring populations enhanced survival of the small populations which would otherwise go extinct due to Allee effect and inbreeding stress. Therefore, it is necessary to extend protection sites considering the importance of migration among populations of Monachus monachus.

Meta-analyses of whalewatching impact studies: differences and similarities in disturbance responses among species

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Whalewatching activities are known to induce behavioural changes that are compatible with anti-predatory responses. However anti-predatory responses can vary depending on the species, population and/or site-specific environmental features. This variability makes it challenging to evaluate whalewatching disturbance and multiple metrics should therefore be used for any impact study.
In this study we used meta-analyses to assess the consistency of anti-predatory responses among several studies on whalewatching disturbance. Changes in swimming speed, activity budget, inter-breath intervals, and deviation and directness index were used as proxies to measure whalewatching disturbance. We also assessed if these changes were due to extrinsic factors (the presence of whale watching regulations), intrinsic factors (species and animal body size) or environmental factors (habitat type).
Our results showed that changes in the activity budget and directness and deviation index were the most consistently reliable metrics in capturing cetacean responses to whalewatching disturbance.
Animals were more likely to travel and less likely to rest and forage ($Q7=81.2$, $p<0.0001$, $k=8$; $Q5=23.2$, $p=0.0003$, $k= 7$; $Q7=49.5$, $p<0.0001$, $k=8$) as a consequence of whalewatching presence. Body size also had an effect on resting activity with smaller animals being less likely to rest in the presence of boats ($Q1=4.1$, $p=0.04$, $k=7$). Our results showed a generalized tendency of cetaceans to increase their path sinuosity (deviation index) and decrease path linearity (directness index) in response to whalewatching disturbance ($Q= 24.6$, $p= <0.0001$, $\tau2=0.09$, $k=5$; $Q= 8.94$; $p= 0.03$, $\tau2=0.05$, $k=5$). Path linearity and predictability also increased in corridor type habitats ($SMD=1.55$; $p=0.004$, $k=5$).
We found that cetaceans overall showed similar anti-predatory responses to whalewatching activities. These behavioural changes reflect greater direct energy expenditure and fewer opportunities for energy recovery respectively and may cause long-term consequences to population fitness. We conclude with highlighting the validity of a meta-analytical approach in studying anthropogenic disturbances.

A review of an unprecedented mass stranding event of short beaked common dolphins on Cape Cod, MA, USA

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Strandings of cetaceans have occurred on Cape Cod, Massachusetts, USA for hundreds of years, with this area being particularly well-known for its frequent occurrence of mass stranding events. Between January and April 2012, the largest and most prolonged single species stranding event recorded in New England's history occurred on a 60 kilometer span of beachfront in the southeastern part of Cape Cod Bay. The majority of stranding events occurred over 83 days and involved 216 stranded short-beaked common dolphins (Delphinus delphis), 98 (45%) of which stranded alive. By the end of 2012, staff and trained volunteers from the International Fund for Animal Welfare (IFAW) had responded to a total of 268 stranded common dolphins from 33 separate mass stranding and 29 single stranding events. Of the 136 total live stranded dolphins, 111 were deemed healthy based on in-field diagnostics including blood analysis and physical exam and were released the same day that they stranded. Ten released dolphins re-stranded and the remaining 101 were considered successfully released (74% of all live stranded dolphins). This record-high frequency of delphinid strandings facilitated response protocol streamlining and efficiency and likely increased the probability of successful release. It also provided an unprecedented opportunity for high quantity and quality biological sampling of an offshore delphinid species. During this event 23 short duration satellite tags were deployed to monitor the post-release success of individual animals in order to evaluate disposition decision procedures. Analysis of satellite tag release data and response innovations will be discussed.

The dolphin biosonar beam is focused in stages: Validation of a vibroacoustic finite element model using bottlenose dolphin simulations

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Environmental concern about the potential impact of anthropogenic sounds on aquatic life has sparked increased interest in marine bioacoustics. Experiments with live organisms are difficult to conduct and require considerable resources. Computerize numerical modelling is economical, reduces the need to expose live animals, and increases our understanding of bioacoustic interactions. Computer models should always be validated by comparing their simulations against results gleaned from live organisms.
We investigated toothed whale biosonar by developing a numerical model that simulates the vibroacoustic functions of the biosonar apparatus (Krysl et al. 2008). In order to validate this approach, we used a vibroacoustic finite element model to recreate sound production and acoustic beam formation in the bottlenose dolphin (Tursiops truncatus). The model is constructed from live and post-mortem dolphin CT scans, tissue property measurements, and custom software. The right and left dorsal bursae were assumed to be the sound sources (Cranford 1988, 1992).
This model confirms several hypotheses from previous studies: (1) the shape of the skull plays a role in the formation of the sound beam; (2) the melon has a significant capacity to focus the transmitted beam; (3) focusing the sound beam apparently happens in a series of stages that include contributions from the skull, nasal diverticula, melon, and connective tissue structures. An unexpected result is that adjustments to the focus and direction of the sound beam can result from small (millimetre scale) changes in the relative position of the anterior and posterior bursa within each sound generation complex. A comparison of our results with those from live dolphin psychoacoustic experiments (Au et al. 1986) supports validation of our vibroacoustic model.

Insight into the North Atlantic fin whale (*Balaenoptera physalus*) population structure by means of stable isotope analysis

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The North Atlantic fin whale population has been subject to heavy exploitation and, although catch levels markedly declined after 1985, the species is still classified by the IUCN red list as endangered. Knowledge of population structure is central to the conservation of the demographic units now protected and to the management of those still under exploitation. Although the International Whaling Commission and other organizations have proposed the existence of a number of subpopulations or stocks with some degree of isolation within the North Atlantic, recent findings showing that movements and migrations are more erratic than expected have questioned the currently accepted demographic structure and the potential connectivity between stocks. To deepen into this subject, we investigated differences in stable isotope signatures between fin whales from Iceland and Spain. Thus, we analysed N, C and O stable isotopes in bone samples from 24 individuals from each area. Individuals were selected to provide similar age and sex composition in the two samples and thus avoid the effect of potential heterogeneity. We also analysed N and C stable isotopes in 10 samples of krill from each area, collected from the fin whales stomach. Results showed significant differences: δ15N and δ18O bone values and δ13C krill values were significantly higher in samples from Spain. The variation of δ18O in bone and of δ13C in krill were consistent with the isotopic baselines of the two areas, unlike δ15N variation, that was probably reflecting the fact that whales fed in areas with different baselines. Overall, results indicated a fine-scale structuring of the North Atlantic fin whale population and possibly a complex pattern of feeding migrations. This strengthens the necessity to better understand movements of individuals and to identify more precisely the location of their feeding areas.
Research carried out with the support of Fundació Barcelona Zoo

Revisiting common dolphin population structure in the Northeast Atlantic using a population genomics approach

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The short-beaked common dolphin (*Delphinus delphis*) is one of the most abundant cetacean species in the Northeast (NE) Atlantic. Despite its relatively large abundance, this species is of conservation concern due to the high level of by-catch it sustains. A recent population modeling study determined that the current level of by-catch is not sustainable under a stock structure scenario of two distinct populations inhabiting NE Atlantic waters. Genetic studies conducted thus far using classical molecular markers (mitochondrial DNA sequences and microsatellites) have failed to detect genetic structure at the geographical scale of the NE Atlantic (excluding the Mediterranean Sea). While this lack of structure could simply reflect panmixia, ecological tracers (stable isotopes and trace elements) suggest that at least three groups inhabit this area. The goal of this study was to reassess population structure using a population genomics approach. We conducted a genome-wide scan for polymorphisms in individuals from the three potential ecological groups using *Restriction site-Associated DNA* (RAD) tags sequencing. Our sampling scheme (n = 82) included common dolphins from: 1) continental shelf waters of the Iberian Peninsula, Bay of Biscay, and Celtic Sea; 2) waters around the Azores; and 3) deep offshore waters off the Bay of Biscay. In a first step, analysis of all variable loci (n = 5910) obtained using this approach produced results that are congruent with classical molecular markers (i.e. very low levels of genetic differentiation). In a second step, we detected outlier loci that were candidates for selection among the putative populations. Analysis of these outlier loci revealed much stronger signals of differentiation. Our results suggest adaptive divergence may exist among the groups identified using ecological tracers, despite an overall background of high gene flow within the whole area.

Behavioural responses of long-finned pilot whales to tagging, military sonar and killer whale playbacks.

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Strong current concerns on the impact of anthropogenic noise on cetaceans drive the investigation into the severity and biological significance of their behavioural responses to acoustic disturbances. Here, we study the behavioural responses of long-finned pilot whales to three stimuli, close vessel approaches, naval sonar and killer whale playbacks, using DTAG-recordings of tagged individuals and visual observations of their group-level behaviour. Pre, during and post vessel approaches were sampled during tagging effort of pilot whale groups in the Lofoten, Norway. Following a recovery phase, this was followed by sonar exposure and/or killer whale playback phases during controlled exposure experiments. Sonar experiments included 3 exposures (1-2 kHz upsweep or downsweep, 6-7 kHz upsweep) and a control (silent) exposure in random order. During close vessel approaches, pilot whale groups more often became very tightly spaced (<1 body length apart), but showed an increase in the distance to other groups. Groups reduced loggings and showed little display. Moreover, tagged individuals performed deeper shallow dives (40-60 m), with reduced vocal activity, as compared to post-tagging phases. While the limited sample size warrants caution in the interpretation of our data, a contrasting response was observed during sonar exposure. Pilot whale groups showed a strong increase in group size, closer proximity to other groups, and increased numbers of loggings and spyhops. However, individuals also performed deeper shallow dives. Interestingly, killer whale playbacks resulted in a similar, but much stronger grouping response with increased levels of surface display events. Hence, our results suggest that in long-finned pilot whales, sonar sounds elicit a social response that is comparable to responses to sounds of potential predators, but opposite to their response to a closely approaching vessel they may want to avoid.

Piecemeal programs poorly protect porpoise populations (and those of other marine mammals): Why conservation isn't working

Wright Andrew(1), (2)

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Conservation efforts typically seek to minimise the impacts of human activity on species of interest. For example, certain areas are off-limits to seismic surveys due to the presence of particularly sensitive species. Similarly, efforts to remove plastic from the oceans may seek to reduce the likelihood that marine mammals will ingest or become entangled in the debris. These actions, while commendable, are generally doomed to eventual failure, at least if they are not supported by additional measures. Such additional measures may include, for instance, a campaign to convince people to stop simply discarding their rubbish to reduce the introduction of plastic into the marine environment in the first place. However, efforts at even these levels are usually not enough to fully address the issue. The problem lies in the fact that the overwhelming majority of conservation efforts focus on specific concerns, without making attempts to coordinate with other efforts directed at related issues. For example, a reasonable amount of the oil sought by seismic surveys finds its way back into the oceans as plastic marine debris. Despite this, groups working to protect narwhals from seismic noise rarely connect with others trying to reduce ingestion of plastic by porpoises. If we really seek to solve conservation problems, rather than merely treat symptoms, we need to work to reduce or eliminate common origins of those problems: in this case, the use of oil. This results in a single message from scientists across disciplines, which is more likely to gain media attention and raise the profile of the issue. In the particular case of oil and plastic, additional allies may be found in the wider field of climate science, further strengthening both causes. Only through such combined action can we hope to truly advance many conservation causes.

Exposure of Monachus monachus to heavy metals and potential adverse effects on the population status of the species

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The Mediterranean monk seal (Monachus monachus) is the most endangered Pinniped in the world and little is known about its exposure to pollutants, particularly to heavy metals. In the present study, the heavy metal burden of the species in livers and kidneys was recorded in 15 stranded animals found in Greece (2000 - 2012), and possible adverse effects on their health/population status were evaluated. Tissue samples were collected during necropsies and stored at -20° C until analysis. Heavy metal (As, Fe, Cd, Cr, Co, Cu, Ni, Pb, Se, Hg) analysis was performed with Inductively Coupled Plasma-Atomic Emission Spectrometry after microwave digestion. Obtained results (μg/g wet weight) showed low levels of almost all metals, with the only exception of As, which was detected at concentrations 10 times higher than those observed in other seal species (i.e. Caspian seal, Phoca caspica). Levels of Cr, Co and Pb in liver and kidney are comparable to previous studies in different species, while Fe, Cd, Cu, Ni and Se are much lower in both liver and kidney. Detected level of As (2.18 μg/g in liver and 2.75 μg/g in kidney) and Se (0.44 μg/g in liver and 0.43 μg/g in kidney) are comparable to those proven to disrupt endocrine activity in vitro of gray seal testicular cells (0.45 μ/ml). Thus a potential adverse reproductive effect can be considered for monk seals, even though further research is necessary to better understand if impairment of reproduction can be a real threat to the species. To our knowledge, this is only the second report concerning heavy metal tissue concentrations in Mediterranean monk seals, and can be considered as a first step in the understanding of contaminant threats to the species.

Short talk presentations:

Brucella surveillance in stranded marine mammals from the south of the North Sea. Is the marine wildlife a potential reservoir of brucellosis for humans?

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Brucellosis is a zoonotic disease affecting both animals and humans. Since marine Brucella infections were reported in humans, marine wildlife has been considered as a potential reservoir of this pathogen. Until now, three natural infection cases of marine brucellosis have been reported in humans. These isolates belonged to the sequence type (ST) 27, a genetic profile that was only found in marine mammals from the Pacific Ocean. These findings suggest the importance of studying the transmission of marine brucellae that until now is not clearly understood. Since 1991 a surveillance programme of stranded marine mammals from the continental coastline of the North Sea (mostly Belgium, northern France and some from the Netherlands) has been implemented. Animals have been analysed by the Marine Animals Research and Intervention Network (MARIN) in Belgium, and bacteria detection and genotyping was made at the Veterinary and Agrochemical Research Center. In total, 462 organ samples from 203 animals were investigated by culture analysis. Brucella spp. was isolated in 7.4%, (15/203) of the stranded animals. The isolates were recovered from harbour porpoises (Phocoena phocoena) (6/136), common dolphin (Delphinus delphis) (1/1) and harbour seals (Phoca vitulina) (5/42) and grey seals (Halichoerus grypus) (3/13). B. pinnipedialis and B.ceti were detected in pinnipeds and cetaceans, respectively. Brucella spp. was mainly found in lungs (n=9) and bronchial lymph nodes (n=6) in infected animals. Under microscope, positive immunohistochemical staining was obtained in tissues and lesions. In conclusion, Brucella infection was, often, found in the respiratory system in stranded animals. Different genetic profiles were identified by Multi Locus Variable Number Tandem Repeats Analysis (MLVA), demonstrating strain variability in Brucella spp. circulating in marine mammals. Further investigations are necessary to establish the biohazard risk of marine Brucella spp.

Small Delphinid Strandings in the Bay of Biscay (France): How Much Are Observed Trends Affected by Variations in Reporting Rates?

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Marine vertebrate strandings offer an opportunistic sampling scheme that can provide abundant data over long periods. Because the stranding process involves biological, physical and sociological parameters, confounding complicates the interpretation of results. The statistical analysis of these data relies on generalized linear or additive models in order to infer long-term trends, but does not easily account for drift or variation in reporting rates.
We capitalized on county-level (administrative) variation following the passing of a law for compulsory reporting of stranded marine mammals in France to investigate variation in reporting rates of stranded small delphinids (Common and Striped Dolphins). Using a time-series spanning more than 30 years across 8 administrative counties in the Bay of Biscay, we built ANOVA-like models for the analysis of count data using a Negative Binomial process. We expanded the model with a recent methodology to detect structural breaks in the time series, focusing on the overdispersion parameter. We performed statistical robustness checks with respect to variations in reporting rates and discuss their causal interpretation in the context of observational data.
Stranding frequencies increased on average 7-fold over 30 years. Controlling for coastal population increase and household access to new technologies, reporting rates to the French stranding network have been stable since the early 1990s, that is after the passing of law for compulsory reporting by local authorities. We conclude that the average 3-fold increase in stranded small delphinids observed in the Bay of Biscay since 1990 is due to other factors, including bycatch.

Marine mammals and fisher networks as sentinels of the changing marine environment in East Africa

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Fifteen years ago, in 1998, when we started our research in Zanzibar, Tanzania, there was little understanding of marine mammals in East Africa beyond that they were; a source of protein accessible through hunt and fisheries bycatch, the best bait for catching sharks and a possible resource for tourism. Since then, the marine environment in the region has undergone rapid changes due to oil and gas exploration and increased human migration to the coastal areas leading to increased fishing pressure, tourism and other anthropogenic disturbances. There is a general lack of long-term temporal and spatial data to track these changes. In this study we engage fisher networks to report observations and catches at sea, initially to aid research on humpback whales but expanded to include data collection on marine mammals, elasmobranchs and the marine environment. Fishers have been supplied with mobile phone waterproof bags, phone credits, simple data protocols and waterproof cameras to report their observations in real time to a research boat and to record the data. Autonomous cetacean click (C-PODs) and song recorders (SM2M) are also used to record occurrence of cetaceans in the study area together with photo-identification data from vessel based surveys. The data collected have demonstrated shifts in dolphin distribution and behaviour due to changes in the marine environment caused by human activities. To improve the data collected fishers will be equipped with smartphones with a data recording App where all data are time and GPS stamped. A plug-in hydrophone will also facilitate whale song recordings. The fisher network is trained during workshops and the data and effort is reported daily. Cheap network rates and very good coverage facilitate the use of phones as data collection tools. The data produced are important for conservation and management to safeguard the animals, the environment and local economies.

Direct evidence for grey seal (*Halichoerus grypus*) predation and scavenging on harbour porpoises (*Phocoena phocoena*)

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Documenting predator-prey interactions and understanding the mechanisms and drivers of prey selection are important to predicting the potential effects of environmental changes on marine mammals. Here, we provide three direct evidences of grey seal predation and scavenging on harbor porpoises in the Strait of Dover (eastern English Channel, France) that occurred between February and April 2013. We also describe possible predation based on external body observations made on two harbour porpoises freshly stranded in January and March 2012 on the northern French coast. Our observations provide the first direct observations of a grey seal preying upon a harbour porpoise (and consequently upon a marine mammal) and evidence that grey seals had killed a least two dead-stranded porpoises. Seals likely appear to target young individuals that are not nutritionally stressed, as suggested by at least two of our observations as well as data from the two stranded porpoises. They also seem preferentially consume the skin and blubber of porpoises and were not observed consuming muscle. These observations add to growing evidence from Belgium and the Dutch coast that grey seals are feeding on harbour porpoises in the southern North Sea and nearby waters. Although only recently recognized, interactions between grey seals and harbour porpoises in the southern North Sea and eastern English Channel warrant further investigation to determine the frequency of interactions, the importance of porpoises to seals as food, whether seal predation is a result of an individual specialization in the foraging behaviour of grey seals.

Detection functions of C-PODs: determining the probability of detecting harbor porpoises using a large hydrophone array

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C-PODs have been used to monitor the spatial distribution and seasonal occurrence of the in the Baltic Proper critically endangered Harbour Porpoise (Phocoena phocoena), using data of absence or presence. However, there is a desire to go one step further and use passive acoustic monitoring to determine absolute density of this population. To do so one must gain information on the so called detection function and, derived from this, the effective detection radius (EDR).
In this study a 15 channel hydrophone array, deployed next to a 12 C-POD grid, was used to localize porpoises and determine their geo-referenced swim paths. The real detection function of C-PODs can then be computed using the distance between the animals and each C-POD. In addition to this, the acoustic detection function of C-PODs has been estimated by playing back porpoise-like clicks. These results are valid for artificial single clicks only, and the real detection function for harbor porpoises will differ.
The differences between the acoustic and real detection function can be due to various factors. On the one hand the acoustic detection function has been estimated using the raw data whilst the real detection function was estimated using data being rerun by an algorithm. On the other hand the playbacks were performed at a maximum source level of 168 dB pp re 1 μPa @ 1 m whilst real porpoises echolocate at much higher source levels.
The effective detection radii for playback experiments varied from a minimum EDR of 71m to a maximum EDR of 204m, and differ from results for the acoustic detection function from other studies. This leads to the conclusion that the detectability of C-PODs, regardless whether for artificial clicks or real porpoises, is not only related to the sensitivity of the POD, but also to other factors.

You can't tell the players without the program: factors affecting species success

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Member number does not solely dictate a group's strength; there are also team dynamics, tactics, and pitch conditions. Although population number has frequently held center stage in determining species' success, there are many other factors to consider when a species may be facing the final whistle. Population composition, predator-prey interactions, life history characteristics of predator and prey, prey availability, and environmental conditions all have an impact.
Here we consider the eastern Pacific gray whale (*Eschrichtius robustus*), whose population has championed following the cessation of commercial whaling. To understand coarse scale evaluations of population number and distribution, knowledge from fine scale studies of the spatio-temporal dynamics of its prey resources is needed. As such, focus is given to a group of whales, part of the Pacific Coastal Feeding Aggregation, that summer on the west coast of Vancouver Island, and its prey reserves in this area. We characterise the predator-prey interaction as firstly an overpowering dynamic with Ampeliscid amphipods, and then later a boom-bust cycling with mysid shrimp species. These relationships, however, are not only shaped from the top-down, but also by the phenology of the mid-trophic levels. Data from whale sighting records, visual-transect surveys, and behavioural observations are tied closely to knowledge of prey distribution and swarm composition. A focus on species-specific growth and reproduction strategies of mysid allows us to understand how swarms rebound after annual removal, and remain a viable resource. Whereas 'underdog' species are reliant on seasonally increased primary productivity, exploitation of overwinter periods of predator release by others maybe the key to mysid population renewal.
We determine that the community 'scrum' of its invertebrates prey will shape future patterns of gray whale abundance and migration, as will climate and ecological change, trophic-system modification, and increased anthropogenic activity in the Pacific.

Identification of suitable habitats for cetaceans in the Canary Basin, NE Atlantic Ocean: evidences of hotspots for beaked whales

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The identification of suitable habitat and hotspot areas for cetaceans are increasingly urgent to inform decision makers on spatial management plans and to tackle anthropogenic threats and global changes. Little or no survey effort has been carried out so far in offshore waters of the Canary Basin (NE Atlantic Ocean) where most of protected areas are coastal or islands areas. As a consequence, there is a lack of data on distribution of many sensitive pelagic species. This is particularly the case of beaked whales. In order to fill this gap, 48 sea-surveys along fixed transects between Continental Portugal and Madeira Island were performed in 2012 and 2013, from July to October. We used GAMs to identify the role of environmental variables in shaping cetacean distribution. Then we built an Environmental Envelope model to map and predict species hotspots in the region.
Results show the richness of offshore waters: in a total of 10636nm sampled, we recorded 234 sightings accounting for at least 9 cetacean species. GAM results highlight the importance of seamounts for all species, though habitat segregation occurs among groups. We recorded 28 sightings of beaked whales, all within a distance of 40nm from the base of the seamounts. Moreover, beaked whales were always sighted further than 55nm from the coast and 50% of the sightings were between 180nm to 240nm from the coast, with a median depth of about 4300m, proving the importance of sampling offshore waters. Maps produced by the Environmental Envelop model highlight that hotspots for beaked whales were also described by dynamic variables, in particular by the presence of productive mesoscale eddies.
Considering ACCOBAMS priorities and EEZ extension for the area, and the urgent need for management plans, we suggest maintaining these sea-surveys to improve habitat modelling and cetacean occurrence prediction.

Effects of whale watching vessels on male sperm whales (*Physeter macrocephalus*) off Andenes, Northern Norway

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The presence of whale watching platforms (WWP) has been associated with changes in cetacean surface behaviour, respiration pattern and behavioural and energy budgets. More erratic breathing, changes in the respiration pattern, diving without fluking and reduced surface time were observed in the presence of WWP in previous studies on sperm whales. Currently three companies operate in Northern Norway targeting male sperm whales in the same waters. Potentially up to 5 vessels can be targeting one individual. Data was collected during the summer of 2012 off Andenes on board a platform of opportunity, in the presence and absence of other vessels. Surfacing and diving times, blow intervals, GPS positions, photo-ID and number of shallow dives, as well as weather conditions were recorded. A total of 247 individual follows were made (39.3% in presence of other WWP). The presence of WWP had a significant effect on sperm whales' behaviour while at the surface, making them 7 times more likely to shallow dive, increasing the probability from 0.026 (95% CI = 0.008 to 0.096) to 0.171 (95% CI = 0.078 to 0.284), and increasing the expected surface time (8.01 min, SE = 0.28) by 6.05 min (SE = 0.66), which was not compensated by longer foraging dives. The presence of WWP did not affect the mean blow interval, its standard deviation or the number of blows, though shallow dives was associated to more erratic breathing, increased blow intervals and changes in the respiration dynamics. Under the current level of exposure the activity has no consequences in the energetic budget of the individuals, though some individuals might be more affected than others. The number of whale watching companies is expected to increase in the area in the near future, which could increase the occurrence of the short term disturbances observed in this study.

Occurrence and behavior of delphinids and harbor porpoises at the northern end of the Istanbul Strait, Turkey

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Competition of predators for prey capture occurs commonly. However, inter-species interaction of odontocetes on prey resource has not been well documented. During summer months in 2010-2012, passive acoustic monitoring was made around a set net at the northern end of the Istanbul Strait (Bosphorus), Turkey, where two delphinid species, *Tursiops truncatus* and *Delphinus delphis*, as well as harbor porpoise *Phocoena phocoena*, are found. Previous visual observations suggest that they concentrate around the set net during the summer fishing season. A stereo two band event recorder (A-tag) was used for species identification as well as monitoring of direction from the deployment position. Totally 56231 click trains were detected in 2010 (73 days sampling effort), 133925 in 2011 (90 days) and 46310 in 2012 (33 days). Click trains were constantly detected throughout the study period. There was no clear diel pattern in sound detections, except occasional decrease in detection before dawn and sunset. Inter-click interval (ICI) of delphinids were generally short (20-40 ms) during night, implying feeding. During daytime, however, they also used long range (100-160 ms) sonar, implying that they were possibly resting. Porpoises were detected less than delphinids except in May 2011 when sand smelt was abundant in the area and both delphinids and porpoises used short range sonar day and night, constantly feeding. Porpoise clicks did not show consistent patterns from year to year in terms of ICI, which implies that they used this area more opportunistically than delphinids. Porpoises localized mostly in northbound from the set net whereas delphinids were located in various directions. Notably, porpoises shifted to the northern end when the delphinids moved toward northbound, suggesting inter-species competition over prey fish resource in a relatively small area.

Vessel activities cause population effects on bottlenose dolphin distribution and behaviour in Cardigan Bay, Wales

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Boat traffic has often been implicated as a significant factor negatively impacting individual bottlenose dolphins. In Wales, two Special Areas of Conservation (SAC) are designated for their protection, with Cardigan Bay SAC in the south of the bay thought to be particularly important. A constant rise in boat traffic levels, particularly motorised vessels, has occurred throughout Cardigan Bay over the last ten years. Cardigan, New Quay and Aberystwyth all show negative correlations between boat traffic levels and dolphin sighting rates between 2007-11. Social network analysis between areas of low and high boat traffic reveal significantly smaller group sizes and tighter associations in areas of high boat traffic whether or not they were regulated suggesting it is not vessel behaviour but rather volume of traffic that is affecting dolphin social structure. Bottlenose dolphin whistle characteristics were analysed and revealed peak, maximum & minimum whistle frequency increased in tighter group formations and in areas of increased boat activity. Line transect survey data collected between 2001-12 indicated a shift in dolphin presence within Cardigan Bay SAC, with the lowest ever estimate in 2012. Additionally, Photo-ID data show turnover within Cardigan Bay SAC to be higher than those for the Bay as a whole, suggesting a smaller and less stable proportion of the population is using the southern SAC. An analysis of 71 dolphins resident to Cardigan Bay SAC between 2001-06 (re-sighted more than six times and in at least half of the years) showed that 21% were sighted less than 30% of the time in later years (2007-13). Although dolphin distribution is probably affected by other factors such as prey availability, we believe the rise in vessel traffic locally to be a contributory factor to the observed changes in dolphin distribution, and should be taken into consideration in all future conservation management plans.

Short-, mid- and long-term effect of biopsy sampling on a resident cetacean population

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Biopsy sampling in live ranging cetaceans is a well-known invasive technique. It consists in collecting a sample of skin and blubber in general by shooting a modified arrow at the animal with a crossbow. This research technique is endorsed by several international organisations such as the International Whaling Commission, due to the positive balance between critical scientific knowledge and low disturbance of the target animals. However, monitoring the technique is highly advised. A resident population of long-finned pilot whales inhabits the Strait of Gibraltar. In winter 2006-2007, their suffered a Morbillivirus outbreak. Since 2006, CIRCE has sampled 89 long-finned pilot whales in the area. Here we present the results of three joint studies to monitor the possible impacts of biopsy sampling. First, we recorded the type and intensity of instantaneous response of targeted animals to the sampling procedure. Then we studied the wound healing process from the sampling day to the complete wound-healing of the skin. Finally we used capture-recapture models with photo-identification in Mark to assess the survival rate of biopsied and never-biopsied pilot whales from 1999 to 2011, and investigated gender differences. Instantaneous responses were null (30.6%), low (43.5%), intermediate (21.2%) or high (4.7%) and the most common response was a fast dive (59.6%). Early wound healing appeared after 3 days, intermediate after 60 days and complete wound healing 260 days post-sampling. The best capture-recapture model (lowest AIC) did not detect different survival rates for biopsied and non-biopsied individuals in 1999-2011, but detected the Morbillivirus epizootic. The second best model detected a higher survival rate for biopsied females than males, the latter suffering a continuous decline after the epizootic. In conclusion, biopsy sampling of long-finned pilot whales had only mild short-, mid- and long-term effects.

The place to be: gender differences in residency patterns of Risso's dolphins (*Grampus griseus*) in the Azores.

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Residency can be defined as the time spent by an animal in a specific geographical area. Understanding the residence patterns is important to establish conservation and management procedures. In this study we investigated the temporal and spatial residency patterns of long-term identified Risso's dolphins (Grampus griseus) off Pico Island (Azores). Photo ID and GPS co-ordinates were gathered during at-sea observations carried out from 2004-2007, spread over 35 sampling months and 386 survey-days. The identified population (n=1250) was initially classified in three arbitrary groups based on years sighted: residents (126 animals sighted on each of the 4 years), partial residents (sighted on 2 or 3 years, 328 animals), and non-residents (sighted only 1 year, 692). Temporal residency rate was analyzed calculating the lagged identification rates (LIR, Socprog 2.4) , per gender, for all resident adults. According to the best model fitting the LIR, the number of resident males (n=33) and females (n=36) was similar, but our results indicate that the resident male population is frequently present on the study area, while females spend longer periods outside of it. Spatial residency was studied using site fidelity and home range (bi-weighted kernel, 50 and 95%) methods, calculated using the AME toolbox for ArcView 3 and the HRT tools for Arcgis 9.3. Only animals with site fidelity and 30 resightings or more were included in the home range analysis. No differences were found in the 95% home range area, but when using the 50% range several male pods were seen to be concentrated in specific areas. Our results support previous suggestions of a resident population of Risso's dolphins off Pico Island but also show relevant differences in the temporal and spatial residency patterns of each gender.

Tidal influence on the occurrence of the harbour porpoise *Phocoena phocoena* in the Marsdiep area, The Netherlands

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Tide is one of the most important factors explaining the distribution and behaviour of coastal marine mammals. In the Marsdiep area, the largest tidal inlet between the North Sea and the Dutch Wadden Sea in the northwestern part of the Netherlands, the presence of harbour porpoises Phocoena phocoena has been studied as a function of time. However, tidal forces instigate a large number of primary and secondary processes, such as changes in water depth, salinity, temperature, current velocity and direction. Historic studies suggest that porpoises are most abundant prior and during high tide. However, currently it is unknown which of the different tidal processes is most important.
To study the importance of this for the Marsdiep inlet, observations were done in early spring from a ferry crossing the area on an hourly basis. Environmental and sightings data were collected by one observer, while an Acoustic Doppler Current Device (ADCP) recorded velocity profiles during each passage. Sightings (n=134) were then linked to the tidal elevation, the geographical position, local depth-averaged water velocity, water temperature (with and without seasonal trend correction) and salinity. Most porpoises (86%) were observed during high tide (n= 65). A correlation with water velocity occurred, but appeared to be an inferior indicator compared with the tidal phase. However, variation in sighting rates was best described by trend-corrected tidal changes in temperature.
The tide dependent sighting rates confirmed that porpoises enter the area during flood phase of the tide and leave during ebb. The effect of temperature suggests that porpoises enter the area in bodies of (warmer) North Sea water. Porpoises seemed to concentrate in areas with relatively low current velocities. The tide dependent movement could be a passive tidally driven influx, or, alternatively a phase in which foraging was most profitable.

When calling matters: Social and behavioural aspects of long-finned pilot whale vocalisations

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Cetacean vocalisations form an essential component of their social interactions and foraging behaviour. We investigated the relationships between the vocal, diving and group behaviour of long-finned pilot whales by combining three data streams: acoustics and diving depth recorded by on-animal digital archival tags (DTAGS) and visual observations of group-level behaviour. Long-finned pilot whales forage during deep dives up to 800 m depth. Their vocal activity strongly increased during these deep dives with respect to periods of shallow diving. This was particularly prominent for echolocation clicks and buzzes, which are associated with prey detection and capture attempts. Furthermore, during deep dives, pilot whales more often produced complex whistles (calls with multiple frequency inflections), suggesting intensified and more complex social communication associated with periods of deep diving when group members may be more dispersed. Simple whistles (no inflections) were produced consistently, irrespective of diving depth or social context. This suggests that these whistles may be used by individuals to signal their presence to other animals in the surrounding area. Interestingly, pilot whales were more often silent in larger, more closely spaced groups with more surface active behaviour (spyhops). This negative correlation between whale numbers and vocal activity indicates that higher degrees of social cohesion may release the function of vocalising. Also during periods of shallow diving, the presence of echolocation clicks was associated with group-level behaviour. This suggests that echolocation clicks may also have a social function. Perhaps clicks are used to locate fellow group members at lower levels of group cohesion. Put together, our results reveal novel functionality of pilot whale vocalisations, strongly associated with socio-behavioural context.

Population genetic structure of harbour porpoise *Phocoena phocoena* across Europe: implications for management.

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The harbour porpoise (*Phocoena phocoena*)is a species of conservation concern and there is a need to define Special Areas for Conservation (under the EU Habitats Directive). Population genetic structure can provide an understanding of relationships between populations and so inform management. Relationships between porpoises from Iberia (n=189), northern Europe (n=113), and Turkey (n=16) were established by genotyping 10 microsatellite DNA loci. Structure-based analysis for the best supported number of a posteriori genetic populations identified three groups: Iberian Peninsula, Turkey and North Europe. As porpoises from Turkey are a different subspecies (P. p. relicta) the differentiation of this population was expected. Principal coordinate analysis confirmed a level of population structure among samples dividing Iberia, North Europe, and Turkey. FST differences between the three groups were significant. DNA sequence variation across 334 base pairs of the mitochondrial control region was also used to determine population structure. In total 167 samples from areas across Europe were obtained and combined with 1352 previously published sequences from Europe, West Africa, Aegean, Marmara and Black Sea. 111 different haplotypes were found; 3 were newly discovered and found only in Iberia. A median-joining network shows no clear population clustering based on sampling origin but haplotypes present in the Aegean, Marmara and Black Seas appear to form a distinct group. However, FST values were significant between all the populations except for Spain versus Portugal and West Greenland versus Iceland. Combined this information identifies Iberian porpoises as a single genetic population that could be defined as a different subspecies and this should be considered in the future designation of SACs and management plans in the study area.

Sowerby's beaked whales in the Azores: ecological insights of an elusive species

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Due to their cryptic surface behaviour and preference for remote, deep-water habitats, Sowerby's beaked whales (Mesoplodon bidens) remain among the most poorly studied cetaceans in the world. To increase our understanding of their behaviour and ecology, we investigated group characteristics, depth distribution and vocalisations of Sowerby's beaked whales off Terceira Island, Azores using concurrent shore- and vessel-based observations. During July and August of 2011-2013, we recorded 79 groups of Sowerby's beaked whales on 28 out of 50 survey days. Group size ranged from 2 to 12 individuals with a mean (± SD) of 4.7 ± 1.9 individuals. Digital theodolite aided shore-based localisation of 54 groups revealed a distribution between 2 to 10 km from shore at a mean depth (± SD) of 1033 ± 246 m. Close-up photographs of the jaws of individuals, frequently lacking observable teeth in the lower jaw, and observations of (newborn) calves (N = 8 groups) suggested that groups commonly contain females, calves and/or subadults. Acoustic recordings of Sowerby's beaked whale vocalisations were made on three separate days, using a three-element towed array (sampling rate 192 kHz). 4 echolocation clicks trains, containing 47 clicks, were recorded. These clicks showed mean peak frequencies, between 25-29 and 61-64 kHz and incorporated frequency modulated upsweeps. In addition, 109 clicks (mean peak frequency: 38 kHz) of a group of 12 whales near the surface were recorded on a DTAG (sampling rate 240kHz), directly following a very brief DTAG attachment and indicates Sowerby's beaked whales produce clicks near the surface, unlike most other beaked whale species. These results present new insights on the ecology, vocalisation and distribution of the Sowerby's beaked whale and suggest that the Azores may constitute a significant habitat for this species at the southern limit of its distribution.

Behaviour modification of common bottlenose dolphins relative to vessels in a busy narrow waterway

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The narrow (from 370m to 950m wide) 6.5km long Galveston Ship Channel (GSC) is a congested waterway that supports large-scale shipping, commercial fishing, and dolphin tourism, where high maritime vessel traffic and common bottlenose dolphins (Tursiops truncatus) converge with potentially negative consequences. Elevated land-based tracking was conducted along the GSC in June-August 2013 using a digital theodolite and Pythagoras software, totaling 31 days and 158 hours of effort. A total of 278 dolphin groups were tracked for a total of 56.58 hours. From a sample size of 223 binned tracks, each 10 minutes in duration, dolphin groups were observed foraging without fisheries during 25% of sampling intervals, foraging behind commercial trawlers during 24% (total foraging time =49%), socializing during 35%, resting during 10% and travelling during 6%, indicating an important foraging habitat. Of the 223 binned tracks, 94 (42%) tracks included vessels (commercial trawlers, dolphin tour vessels, commercial joy rides, and personal speed boats) that were <45m from the focal dolphin group, including 21 accounts of boats operating directly through a focal group. When vessels were present within 45m, dolphin mean swimming speed increased (from 1.82±1.05SD km/hr to 2.64±1.49SD km/hr), reorientation rate decreased (from 46.52±27.21SD deg/min to 41.06±28.56SD deg/min), and linear movement increased (from 0.52±0.30SD to 0.61±0.33SD). Dolphin behaviour varied greatest in the presence of dolphin tourism boats (mean swimming speed =3.41±0.80SD km/hr) and commercial trawlers (mean swimming speed =3.27±1.91SD km/hr). Field observations support quantitative analysis that bottlenose dolphins modified their behaviours in the presence of vessels, particularly during fast and erratic vessel approaches when dolphins were observed diving prematurely with increased dive durations. We suggest that this behavioural harassment (as defined by the US. Marine Mammal Protection Act of 1972) in the GSC is detrimental to the normal functioning and physiological health of the members of this population.

How many bottlenose dolphins (*Tursiops truncatus*) inhabit the former Cres-Lošinj Special Marine Reserve, Croatia?

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Cres-Lošinj archipelago (Croatia) is a popular nautical tourism destination, important fishing ground and home to a resident bottlenose dolphin population. Previous study showed a significant decline in abundance of these dolphins between 1995 and 2003. This situation presents a conservation challenge that was tried to be tackled by declaration a Special Marine Reserve for dolphins in 2006. Protection lasted only three years and no conservation measures were put in force. We conducted a photo-identification study with the aim to estimate the number of bottlenose dolphins inhabiting the then proposed marine protected area and eventually inform the management. Dedicated boat surveys were conducted in a 525 km2 area between 2004 and 2011. A total of 440 sightings were recorded and 349 individuals were photo-identified, of which 54% were seen in four or more years and 6% were seen in all years. Many of the individuals encountered in this study were also regularly seen in the previous study (1995-2003) in the same area. Percentages of immature animals varied from 11% in 2007 to 20% in 2004 (mean=15.8%; SE=1.4). Capture histories of 181 individuals classified as "marked" were used to derive abundance estimates using the standard mark-recapture techniques and a closed model with Chao Mth estimator. Obtained abundance estimates varied significantly between years, with lowest value calculated for 2008 (N=112; CV=0.16; 95% CI=94-150) and the highest for 2006 (N=310; CV=0.12; 95% CI=265-392). Since our study area represents only a portion of this population's home range, these inter-annual variations are more likely reflecting shifts in habitat use within the home range rather than the actual changes in population size. This is supported by very low observed migration between this area and others in the Adriatic. Nevertheless, it raises concerns about the causes for these shifts and populations resilience to these causes.

Recombinant antigen-based ELISA for lungworm detection in seals

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Harbour seals are characteristic mammals for the German Wadden Sea. Two mass mortalities 1988/89 and 2002 caused by phocine distemper virus (PDV) led to the death of more than half of the population. Since then, the population size has recovered to an estimated 39,400 individuals.

Young seals are frequently infected by the lung nematodes Otostrongylus circumlitus and Parafilaroides gymnurus which can threaten their health tremendously. The parasites and secondary bacterial infections can lead to severe bronchopneumonia and death. Recently, an increasing trend of lungworm infections and subsequent mortality was suspected in the Dutch part of the Wadden Sea.

Lung nematodes are mostly diagnosed post mortem. Little is understood about the epidemiology and immunology of these infections. The aim of this study is to develop a serological test which detects lungworms in live seals and to monitor the antibody course during infections.

A recombinant antigen-based enzyme linked immunosorbant assay (ELISA) to detect antibodies against lung nematodes in blood of seals is currently developed. Major Sperm Protein (MSP), a protein family which occurs only in nematode sperms, was chosen as the antigen. MSP has been proven to be a suitable diagnostic antigen for lungworms in cattle (Dictyocaulus viviparus). MSP-DNA of the lungworm species infecting harbour seals and harbour porpoises was isolated and amplified with degenerated primers.

Sequence analyses showed that MSP of D. viviparus and O. circumlitus differed in one amino acid only. ELISA experiments with recombinant MSP of D. viviparus as antigen showed significant optical density differences between serum samples of infected and uninfected seals.

An ELISA could be an effective tool to reveal epidemiological and immunological dynamics of the infection and to advance health status surveillance of seals. It can give rehabilitation centers a decision basis for further treatment and may determine anthropogenic effects on the ecosystem.

I-Collect the new platform for a better marine mammal research.

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In an ideal world, marine mammal researchers will have one platform for data collection. Basic edition for sporadic sighting done by the public (citizen science), and professional edition for researchers to collect effort and sighting data. The basic edition called I-Collect will be ready to download in the conference. Basic data such as time, position, group size and picture of the marine mammal will be collected via an application working off-line. The data collected by the public will be open and available for each research group to monitor the sightings reported in their area of interest.
I-Collect initiative is a cloud based, large scale, scientific data collection platform. The data can be collected by anyone using smart phones, tablets, GPS camera and the like. Designed to be modular and flexible to any kind of data, our first implementation is focusing on dolphin's research.
The platform includes:

- Cloud base services
- Cloud base agents
- Smart phone and Tablets application
- Web access
- Social media integration (like Facebook app)

The platform supports three phases of scientific research:

- Uploading raw data
- Data enrichment and improvement
- Data research (e.g. data query, data mining) and reporting

The data enrichment can be done automatically using the cloud base agent (autonomous processes):

- Collect complimentary data from external resources (weather, temperature etc.)
- Improve the data (image processing, time correction)
- Validate the data accuracy and credibility
- Online notification (trigger event such as proximity of dolphins)

Integration with social media grants the data collector (contributor) feedback and incentive for their effort.

Cetacean in the Pelagos sanctuary: need for a multi-scale management approach

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We use 5-years summer data (2009-2013 late May-end of September) systematically collected along fixed transects crossing the Pelagos Sanctuary (PS-Northwestern Mediterranean). We examine species habitat preferences at different spatial/temporal scales. Broader patterns are investigated separately in the western and eastern region of PS. To allow direct comparison, yearly/monthly indexes of species presence are computed as a proportion of the encounter rate of the species in a region and the overall ER for the species in the PS (indexregion_sp_y/m=ERregion_sp_y/m/ERPS_sp where ER=n sightings/hours on effort). Habitat variability is examined using maps of the phytoplankton bloom, obtained by 1-km maps of sea surface chlorophyll distribution. At a finer scale, a 5km grid is used to map yearly/monthly species aggregation areas within each region. Strong-interannual variability is shown, with the alternation of 'rich' (eg.2010-2012-2013) and 'poor' years (eg.2009-2011). Striped dolphin (sc) and fin whales (bp) in the eastern region well reflect this pattern, while they show stability and constant increase, respectively, in the western region. Monthly indexes show no pattern for sc while reflect migratory movements from/into PS of fin whales. Cuvier's beaked whale (zc) peaks of presence coincide with lowest presence of sperm whales (pc), both yearly and monthly, evidencing spatial and temporal habitat partitioning among the two species. Risso's dolphin show strong fluctuations in the eastern region and is more rare in the western, while pilot whales are almost stable in both regions over the years, showing strong monthly preferences. Bottlenose dolphins alternate rich to poor years in both regions, with a preference for the eastern region and early summer months. Aggregation hot-spots are species specific. Bp and pc hotspots vary both yearly both monthly, while zc hotspots are consistent among years. Based on these results we propose a multi-scale approach for the management of the Pelagos Sanctuary.

Underwater noise from seismic oil exploration in Baffin Bay, Greenland

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Seismic air gun arrays used for oil and gas exploration are among the most powerful anthropogenic noise sources, which raises concern about detrimental effects on marine mammals. Possible effects include physical injuries at close range, while behavioural effects are possible at large ranges, potentially affecting a much larger number of animals and over longer time than the physical injury. Despite this concern, very little information is available about the noise from seismic arrays measured at large ranges. This is especially true for the Arctic, where cold temperatures and melting glaciers may affect the sound propagation differently compared to temperate waters. In the autumn 2012 an unusually large seismic survey program was undertaken in Baffin Bay, West Greenland, where 4 large seismic vessels operated in the same area simultaneously. To test the ability of sound propagation models to predict sound exposure to marine mammals in the Baffin Bay the noise from the ships were recorded by 21 autonomous dataloggers (DSG-Ocean, Loggerhead ltd. 10Hz - 20 kHz bandwidth), deployed on seven moorings up to 700 m depths, with three loggers on each mooring at different depths. Modelling of the received levels as a function of bathymetry and sound velocity profiles show that certain features of bathymetry may facilitate sound propagation, forming channels in which the noise can propagate with relatively little attenuation. Maximum recorded broadband peak-peak levels about 35 km away from one seismic ship were 178 dB re 1 uPa (SEL 161 dB re. 1 uPa2s), well above levels known to be capable of inducing significant behavioural reactions in bowhead whales and belugas. We conclude that seismic surveys in the Arctic have the potential to evoke significant behavioural responses at long ranges and that bathymetry and sound velocity profiles must be considered carefully in environmental impact assessments.

Long-term research: essential for understanding how cetaceans are indicators of a changing environment in the Central-Southern Mediterranean Sea

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Changing water temperatures, prey abundance, human activities and resilience of the different cetacean species and populations found in the Central-Southern Mediterranean – at the heart of both anthropogenic and biodiversity cross-roads - demand challenging long-term investigations to provide the reliable and relevant data for effective cetacean conservation. Some of the interesting outcomes of the long-term cetacean research that has been undertaken in the study area of 120,000km2 around the Maltese Islands since 1997 are presented. Scientific surveys have regularly measured abundance and distribution of various cetacean species, including Bottlenose (Tursiops truncatus), Striped (Stenella coeruleoalba), Common (Delphinus delphis) and Risso's dolphins (Grampus griseus), Sperm (Physeter macrocephalus) and Fin (Balaenoptera physalus) whales, and have regularly taken record of various environmental and anthropogenic variables in the same region. Both marine and aerial surveys were conducted through out the years. Various statistical and modelling results obtained show that different cetacean species may be considered effective indicators of different environmental conditions and changes. As climate change effects physical, chemical and biological conditions of the marine environment typically inhabited by resident cetacean populations, the latter find it harder to adapt to rapid ecological permutations. Shifts in these conditions force cetaceans to move into less familiar and risky feeding, breeding and young-rearing grounds. Increasing opportunistic behaviours would place cetaceans in a dire situation increasing their vulnerability. Though species specific modelling provide basic description of environmental requirements for each cetacean species present in a region, rapid environmental change of various parameters form synergistic impacts on cetacean life-history and survival which are not easily predicted. Long-term conservation research is necessary as changes in cetacean species abundance, redistributions and range extensions or reductions are expected to signal and reflect various changes progressively taking place in our seas even before we fully comprehend the complex dynamics of these changes.

Population ecology of a resident population of common bottlenose dolphins (*Tursiops truncatus*) in North Patagonia, Argentina: the most popular dolphin species on its way out?

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A coastal bottlenose dolphin population from Bahía San Antonio (Patagonia, Argentina) was subject to a photo-identification study between 2006 and 2011. Effort of land- and boat-based surveys totalled 1470h during which 413 dolphin groups were observed, resulting in the identification of 67 individual dolphins. Of these, 57% were defined as residents, 34% as partial residents and 9% as transients. Adult dolphins associated with a calf were significantly more resident in the study area than all other identified dolphins.
Seasonal abundance estimates ranged from 40 (95%CI: 16.1-98.8) to 83 (95%CI: 45.8-151.8) individuals. Adult survival rates varied between 0.97 (± 0.037 SE) and 0.99 (± 0.010 SE), and the probability of temporary emigration was equal to the probability of permanent emigration, averaging 0.047 (CI: 0.004 – 0.637) annually. The average calving interval equalled 3.5 ± 1.03 years, with an estimated 3.5 births/year population-wide resulting in a minimum annual birth rate of 4.2%. Documented calf mortality equalled 22% annually, however data strongly suggest some calves may have been lost before they were documented, leading to an underestimation of birth rate, calf mortality and possibly the number of reproductive females. Recorded birth and recruitment rates are insufficient to compensate for mortality in the population.
Analysis of social structure indicates that, although this community clearly qualifies as fission-fusion society, the association index values within this population were high when compared to other dolphin populations worldwide.
This bottlenose dolphin population from Bahía San Antonio is small, isolated and declining. Subsequently found low genetic diversity supports our findings of its extreme vulnerability. Despite extensive research, worldwide increasing numbers of populations of once “common” bottlenose dolphins are reported to be declining.

Poster presentations:

Poster code : DISTRI-1

Prey habitat model outperforms prey data in explaining grey seal distribution

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To understand the impact of human activities on the marine environment, information on the spatial distribution of marine organisms is required. However for moving organisms, information on distribution alone is often insufficient, because individuals visit multiple habitats, each of which may play a vital role in increasing the organism's fitness. Therefore it is important to understand why they select certain sites. For marine mammals, this motivation is to a large extent driven by the occurrence of their prey. Although it seems intuitive to expect spatial co-occurrence between predator and prey, it is often difficult to detect such relationships due to the dynamic nature of the marine environment.

The objective of this study is firstly to assess whether the distribution of a marine predator can be explained by the distribution of its prey, and secondly, whether it can also be explained by a model of prey distribution based on abiotic environmental covariates. More specifically, using telemetry data we study how the spatial distribution of grey seals (*Halichoerus grypus*) in the North Sea correlates with the observed, and predicted distribution of their major prey, the sandeel (Ammodytae).

Although this study reveals that grey seals prefer sandeel grounds, the model-based estimates of sandeel occupancy based on sediment type and depth was better at explaining variation in grey seal density within and around the sandeel grounds. The better explanatory performance of the prey habitat model may be due to the more extensive and better-resolved data for the abiotic covariates in contrast with the stochastic nature of prey survey data. Also, abiotic variables may be correlated with additional important prey characteristics such as quality and catchability.

Poster code : HUMA-1

Assessing the risk of ship strike from sperm whales (*Physeter macrocephalus*) off Andenes

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The recent increase of ice-free areas related to global warming processes, have led to de intensification of vessel traffic in the Arctic and the opening of new commercial routes. The development of the oil industry in these areas is also contributing to this expansion. The waters off Andenes (69°18′51″N 16°07′09″E) in the Norwegian Sea have recently been identified as an area of high ship density, which is added as a threat for marine mammals to the intense military activity and seismic surveys among others. These waters are known to be an important habitat for male sperm whales (*Physeter macrocephalus*) which are of great interest for the local whale watching and general tourism industry. Ship strikes have been also pointed out as one of the biggest causes of mortality of sperm whales in several parts of the world, and so it was suspected for the study area, though no evidence through necropsy or incident observation was available. The 12 of February of 2013 a dead sperm whale with clear signs of ship strike was sighted off Andenes. The present work intends to evaluate the risk of ship strike for sperm whales in the waters off Andenes. Sperm whale distribution information collected during 2013 from opportunistic platforms (whale watching vessels and land-based) will be modelled for preferred habitat and compared to the ship traffic density obtained through AIS data in order to identify the areas of higher potential risk for sperm whale ship strike with fast transport vessels such as cargo ships and the whale watching industry. The results will be presented at the conference.

Poster code : BEHAV-16

When Do Dolphins Bow-Ride in the Istanbul Strait?

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Bow-riding behaviour of bottlenose dolphins (*Tursiops truncatus*) was studied in the Istanbul Strait, Turkey, from September 2011 to October 2013, to determine if this behaviour was for energy saving, enjoyment, or related to foraging. We studied bow-riding behaviour in detail in terms of behavioural budget, area preference, marine vessel density, prefered vessel type and identities of bow-riders. 453 photographs and 10 underwater videos were analysed. Bow-riding represents 1,07 % of their total behaviour budget. From the resident group, 34 identified individuals were observed bow-riding, among which only four animals, however, repeatedly observed bow-riding. Thus, bow-riding was generally demonstrated by different individuals.
While there was a significant effect of locations on bow-riding behaviour, no statistical significance was found for seasons, although spring had the highest counts. While, bow-riding was observed mostly in the southern and northern end of the strait, middle section was only favoured during summer. Section preference of bow-riding was related to feeding activities in the Strait. Moreover, feeding was the most common preceding and follow-up behaviour of bow-riding group. Travelling prior to bow-riding was also reported, which indicates an intentional approach to vessels, although bow-riders returned their original spots after bow-riding.
Further, marine vessel density limits bow-riding as no bow-riding occurred when 3+ vessels appeared within a 100m radius or 10+ vessels within a 400m radius. The narrow middle section where marine traffic was highest were the least favoured section. Moreover, bow-riding was observed exclusively with big cargo ships.
This study shows bow-riding individuals have clear preferences regarding areas, vessel densities/types, and related with feeding activities. Although this study did not clarify all aspects of this behaviour, dolphins in the Istanbul Strait appear to bow-ride for play and possibly, use this as a foraging strategy but do not bow-ride for travel purposes.

Poster code : ACOU-1

ARION: a tool for real time bottlenose dolphin monitoring in the Portofino MPA

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Bottlenose dolphin (*Tursiops truncatus*) is one of the Mediterranean cetaceans listed in the Annex II of Habitat Directive. The main objective is the creation of a virtual corridor for monitoring and surveillance of the transient and resident bottlenose dolphins. Concrete conservation actions take place in the Portofino MPA (Italy). We show the implementation of an interference avoidance system capable to track the dolphins, to identify threats and to prevent collisions by diffusing real time warning messages to all categories involved. Two detection units are placed one kilometer off the coast of Portofino headland. Each unit is a particular type of marine buoy (elastic beacon) equipped with four hydrophones and an acquisition system which can record the typical "social communication whistles" emitted by the dolphins and the sounds emitted by boat engines. Signals are then sent on shore, via wi-fi, and elaborated to get the real time position of dolphins and boats. Upon reception of the warnings the boats present in the area will be invited to follow a protocol of conduct supervised by the Coast Guard. This approach will improve the species protection, the sustainable coexistence of dolphins and anthropic activities and will promote responsible usage of the sea, especially in one of the most touristic Marine Protected Area in Mediterranean Sea. We illustrate the technical details of the automatic system for bottlenose dolphins conservation and results of first ten months of observation will be reported. This study is part of the Life+ Nature Project "ARION" co-funded by the European Commission.

Poster code : ABU-1

Cetaceans in the Balearic Sea (NW Mediterranean basin): new data of sperm whale (*Physeter macrocephalus*) population

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The Balearic Sea, in the northwest of the Mediterranean basin, is an understudied area. No long-term study has been conducted to date to specifically estimate the species distribution in this region, especially sperm whale population. From 2010 to 2013, ship-based visual and acoustic lineal transect surveys to study cetacean populations were conducted in the Barcelona-Balearic Islands strip (20000 km2). Results concerning presence, diversity and sighting rates after around 3000 km of visual effort are presented. 8 species were detected in 197 sightings of which 49% correspond to striped dolphin (*Stenella coeruleoalba*), 16% to fin whale (*Balaenoptera physalus*), 9% to sperm whale (*Physeter macrocephalus*), 5% to bottlenose dolphin (*Tursiops truncatus*), 5% to Cuvier's beaked whale (*Ziphius cavirostris*), 3% to Risso's dolphin (*Grampus griseus*), 2,5% to common dolphin (*Delphinus delphis*), 0,5% to pilot whales (*Globicephala melas)* and 10% to non-identified cetaceans. Special attention is given to sperm whale in order to highlight data that shows that there is possibly a population in this area that hasn't been described before. The encounter rate for the sperm whales was of 0,006sighting/km (18 sightings); sightings were usually of females with juveniles and calves groups. Also acoustic data was collected along around 5000 km of acoustic effort with 26 sperm whales detected in total (0,008detections/km). The sperm whale is determined in this area as a rare or absent species according to ACCOBAMS. For this reason further study focusing on sperm whale population in Balearic Sea should be done. This data points out the importance of this area for some cetacean species. Currently more effort is being done and planned in order to obtain deeper insight and to contribute to collaborative effort in research and conservation actions at Mediterranean level.

Poster code : CONS-1

No mass strandings since sonar ban in Canary Islands (2004-2013)

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Naval sonar operations have long been implicated in mass strandings of marine mammals, particularly beaked whales (R. Filadelfo et al. Aquatic Mammals 35, 435-444; 2009). The Canary Islands were a hotspot for such mass strandings until the Spanish government imposed a moratorium on naval exercises in their waters in 2004, since when there have been no further no beaching events. A mass stranding in the Canary Islands in 2002 of 14 beaked whales (family Ziphiidae), one of the deepest-diving whales, was linked to naval military operations employing mid-frequency sonar in the area (P. D. Jepson et al. Nature 425, 575-576; 2003); in 2004, four Cuvier beaked whales (Ziphius cavirostris) stranded there following an international naval exercise (A. Fernandez et al. J. Marine Sci. Res. Dev. 2, 2 ; 2012) These events prompted the EU parliament to issue a non-binding resolution in 2004 to stop the deployment of high-intensity sonar until the completion of a global assessment of its cumulative effects on whales, dolphins, fish and other marine life. Following this resolution, the Spanish parliament established a sonar moratorium later that year around the Canary Islands as a protective measure. Since then, investigations done at University of Las Palmas concluded no further mass strandings of beaked whales or other cetaceans in the Canary Islands. It would seem that the EU parliament resolution and Spanish moratorium have been responsible for a remarkable conservation success for cetaceans.

Poster code : ABU-2

Monitoring cetacean outside the borders of the Pelagos Sanctuary: seasonal variability in cetacean presence along a cross-border fixed transect in the Western Mediterranean Marine Region and implication for conservation purposes

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The international Pelagos Sanctuary was established aiming to protect suitable habitats for most cetacean species regularly found in the Mediterranean basin. The effectiveness of this MPA to conserve highly-mobile animals is under discussion as well as a proposal of enlargement of the protection over the borders of the Sanctuary.
An year-round monitoring program (October 2012-September 2013) was conducted along a transborder fixed-line transect from Civitavecchia (Italy) to Barcelona (Spain) in the Western Mediterranean marine region, encompassing the seas outside the south eastern and western borders of the Pelagos Sanctuary. Seasonal distribution, encounter rate (ER=sighting·10Km-1±SE), group size and species richness of all cetacean species were analysed for the three segments in Central-Tyrrhenian sea (Ts), Bonifacio-Strait (BS) and Sardinian-Balearic seas (SBs).
A total of 496 sightings were recorded over 21.375 Km travelled on effort. All the 8 species considered regular in Mediterranean were sighted with highest percentage of fin whale and striped dolphin (respectively 37% and 33%). No significant differences were recorded in total ERs between seasons, being the highest values recorded in spring (ER=0.26±0.02). Seasonal differences were recorded in species richness and distribution. Main highlights are: fin whale concentrated highly in BS in winter while concentrated mostly in SBs in the other seasons and in Ts in summer; striped dolphin sightings distributed along the Ts and SBs segments in Spring/Summer and mainly in SBs in Autumn/Winter; squid-eater species generally distributed in high-sea areas deeper than -2000m in SBs while high ER was recorded in Ts in summer; bottlenose dolphin was mainly sighted in BS but was also sighted in large groups (>8 individuals) in high-sea areas in Spring/Summer in SBs.
Outcomes highlight the importance of the investigated areas for cetacean and stress the need for large-scale, long-term systematic monitoring to deliver information for an adaptive conservation effort on these highly-mobile species.

Poster code : ABU-3

Rapidly growing Steller sea lion rookery on Tuleny Island: migration or self-growing?

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Steller sea lion (SSL, *Eumetopias jubatus*) rookery on Tuleny Island (Sakhalin) is increasing while the total population in Russian Far East is declining. This rookery was formed on the small island about 30-40 years ago. The study was started in 2006 and includes population monitoring and observation of branded animals. Our studies on Tuleny Island demonstrate that the number of adult (1+) SSL was increasing and currently is about 2000 animals. Number of pups on the island was also rapidly increasing (over 50 per year) with the current number about 1000. Based on the Steller Sea Lion hot brand project data, observations shows that number of migrated SSL (that was born on other rookeries) was stable at about 100 animals at least during last 6 year. But number of migrated SSL females who gave birth on Tuleny Island is increasing: in 2006 they combined 9% and in 2013- 25% from all branded animals. Therefore, the increasing number of SSL on Tuleny Island rookery caused by female's migration from the other islands and self-growing.

Poster code : REPRO-1

Whale watching in Bahía Málaga, Colombia and its effect on the behaviour of local humpback whales

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Bahía Málaga (3°53'N, 77°22'W), Colombian Pacific, is one of the most important breeding sites humpback whale (*Megaptera novaeangliae*) in the Pacific Southeast and currently the most important site of tourist observation of whales in Colombia. To evaluate the short-term effect of whalewatching vessels on humpback whales, we recorded the number of encounters between whale-watching vessels and humpback whale groups and documented aerial behaviour of the animals before, during and after the arrival of whaling watching vessels, over 488 daytime hours from a 20m high shore platform in August and September 2008. Whale watching in the area was conducted using 17 small boats (7m long) and two ships (30m long) carrying a total of over 3000 tourists/month. Over the observed time period, whale watching operations encountered 39 whale groups, 77.4% of which were with mother-calf pairs. 37.6% groups of whales were followed by one vessel, 48.4% by two to four vessels simultaneously, while the rest was followed by up to 10 vessels. On average, encounters lasted 30.9 minutes with a modal distance of 62.2 meters between whales and vessels. Most of the vessels (92.6%) pursued the whales, and 91.4% of the vessels followed the whales at a fast speed (>20 knots). Comparing behaviour before and after whale watching encounters, we found that whales did shorter dives ($X^2=30.7$, $p<0.001$) and showed a higher frequency of spinbreaching ($X^2=8.8$, $p=0.012$) and fast displacement ($X^2=33.0$, $p<0.001$) in presence of a whalewatching vessel; while the occurrence of resting behaviour declined ($X^2=17.0$, $p<0.001$). We conclude that whale watching intensity is very high in this important breeding area and that there is a short term effect of whalewatching vessels on the behavior of humpback whales. We therefore recommend proposing and following mitigation actions.

Poster code : ANA-PATH-1

A preliminary pathological and parasitological study on cetaceans in Turkey : Five cases from the western Black Sea coast

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In recent years, more effort and studies have been made for monitoring the populations of cetaceans in the Turkish waters than in the previous years. However, there is insufficient data and research on diseases and pathogens of cetacean populations in the Turkish coast. In this study, from the Western Black Sea coast of Turkey in 2011, postmortem examination findings of two bycaught and three stranded cetaceans are presented. We examined one bycaught male common dolphin (Delphinus delphis), one bycaught and three stranded male harbour porpoises (Phocoena phocoena). Properly sized tissue samples were collected and fixed in 10 % formaldehyde, embedded in paraffin blocks, stained with Haematoxylin and Eosin, and examined under light microscope. Macroscopic parasites were found in lungs, stomachs and sinuses, stored in 70% ethanol, cleared with lactophenol and examined under light microscope.Severe verminous pneumonia, cellular pneumonia, hemorrhage, edema and emphysema lesions were detected in the lungs by histopathological examination. In the lung tissue of the common dolphin, severe smooth muscle hypertrophy was detected around the smooth muscles surrounding arterial vessels, bronch and bronchiole walls. Parasitological examination of porpoises in which verminous pneumonia was detected resulted in the identification of Stenurus minor and Halocercus sp. These findings provide baseline data for monitoring cetaceans in the Turkish coasts and should be continued and developed covering all Turkish coasts.

Poster code : CONS-2

Mediterranean monk seal (*Monachus monachus*) in the Gulf of Corinth (Greece): first sightings of the century

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The Mediterranean monk seal, Monachus monachus, is a critically endangered species, listed by I.U.C.N. experts among the twelve animal species in greatest danger of extinction in the world. The main surviving groups are found in Greece and in Mauritania. Its world population is estimated to be 400-500 individuals, of which 200-250 live in Greece, where it is widely spread. Small populations have been recorded in the islands of the Ionian Sea, in the Aegean Sea and in the Dodecanese area, showing a certain preference towards solitary and abandoned rocky coasts. None record on monk seal presence inside the Gulf of Corinth exists for the new century. The Rescue and Information Network for the monk seals in Greece reports a single stranding in the Gulf of Corinth for the period 1985-1995, indicating a sporadic presence of the species in this area, in previous years. During the month of July 2012, while monitoring cetaceans in the Gulf of Corinth, an adult individual of monk seal was sighted in two distinct occasions, with a latency of 20 days, and in two different areas, located 5 miles a part. Details of both sightings are presented.

Poster code : REPRO-2

An investigation of the relationship between reproductive success and home range of the bottlenose dolphin (*Tursiops truncatus*) in Wales

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Although some studies have examined bottlenose dolphin (*Tursiops truncatus*) home range, few have investigated individual variation in home range patterns within a population. Our aim was to investigate the home ranges of individual bottlenose dolphins in relation to reproductive success so as to inform conservation management within Cardigan Bay, West Wales. This was undertaken by analysis of photo-identification data collected during boat-based surveys between 2001 and 2012. Minimum convex polygon and kernel density estimation maps of home range and core areas were created for individuals and groups. Home range and core area results comparing males with females showed no significant difference although based on mean values, male home ranges were slightly larger than for females. Twenty-two females were selected for home range analysis and sightings of individuals with/without a calf were compared. These showed no significant differences in home range or core areas between the two categories. The 22 selected females were then divided into subgroups for the following comparisons of reproductive success: high versus low calf production (four calves versus two calves produced during the study period), high versus low calf survival (at least one calf survived into third year versus calves seen only as a newborn), and long versus short inter-birth interval (4 to 6 years versus 1.5 to 3 years). Based on these comparisons, the results suggest that females use a smaller home range area and core area when calf production rate is high, calf survival rate is high, and inter-birth interval is short. These findings highlight a clear correlation between home range and reproductive success, which should help inform management plans for the species.

Poster code : HUMA-2

Interaction Between Fisheries and Dolphinide Species in Cyrenaica (Northeast Libya)

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Information about cetaceans in Libya is scars despite the country's long coastline (which is 40% of the whole Southern Mediterranean coast). A pilot stage of a long term study was conducted in 2012/13 which involved distributing questionnaires among fishermen in northeast Libya to assess;
a). the presence of delphinidae species in Cyrenaica.
b.) special or temporal trends and the distribution of these species.
c.) density and behavior observed by the fishermen.
d.) interaction with gear and the fishermen's attitude toward dolphins.
Other information gathered from the fishermen included; personal details, fishing gear and vessels types, fishing seasons and grounds.
Results show that there are five species of dolphinde present in the area, these are (in order of frequency); bottlenose dolphin (Tursiops truncatus, 60.64%), short-beaked common dolphin (Delphinus delphus, 19.15%), Striped dolphin (Stenella coeruleoalba, 13%), Risso's dolphin (Grampus griseus, 3.2%) and pilot whale (Globicephala melas, 4.3%). G. melas was only identified by a small number of fishermen who also recognized Spy Hoping in the behavior section. When cross referenced with other data from the questionnaire, these few fishermen were operating separately in large trawling or longline vessels and their fishing grounds are usually in deep waters beyond the continental shelf. This might be an indication that the species may be present in the Cyrenaican waters.
Interaction with fisheries seemed mostly to be; Rare (41%) or No-Interaction (24.6%) and mainly done by bottlenose dolphins on longline fisheries. However, this interaction seemed to be overlooked by the majority of fishermen (82%) who showed little negative reaction toward the predation act. On the other hand, the fishermen showed strong negative attitude toward sharks and marine turtles whom they believe to be their main competitors and not the cetaceans.

Poster code : ECO-1

Developmental changes in adiponectin in grey seals are not related to nutritional state, body mass, milk fat content or efficiency of mass transfer

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Careful regulation of energy storage and utilisation is essential for maximising reproductive fitness and survival probability. Female grey seals fast during their annual ~18 day lactation period. They invest substantial amounts of their energy reserves to raise a single pup, and may not breed in the year following a large investment. Their pups' first year survival is heavily dependent on adiposity at weaning. Although larger mothers tend to produce larger, fatter pups, mechanisms regulating fat stores and efficiency of fat transfer from mother to pup during suckling are poorly understood. Adiponectin is a key regulator of fat metabolism produced by adipose tissue that may be involved in fuel regulation in seals. We tested the hypotheses that circulating adiponectin levels are related to 1. nutritional state (fasting versus feeding), body mass and/ or age, rate of mass gain, or efficiency of mass transfer from the mother in wild grey seal pups; 2. duration of fasting, body mass, milk fat or fatty acid content, and/ or maternal expenditure (% postpartum mass lost) in their mothers and 3. circulating fatty acid concentration in both females and pups. We found a significant reduction in adiponectin in pups during suckling and the first ten days after weaning, which was best explained by age, rather than by body mass or nutritional state. There was no change in circulating adiponectin in adult females during lactation, despite a 36 ± 5.6% reduction in body mass. Adiponectin was not related to milk free fatty acid concentration or creamatocrit, an indicator of fat content, and did not explain variability in the efficiency of mass transfer from mother to pup, pup mass gain or maternal expenditure. These data suggest that adiponectin may be more important in regulation of insulin sensitivity and/ or inflammation than in fat metabolism in grey seals.

Poster code : PHOTO-1

An assessment of the natural marking patterns used for photo-identification of common minke whales (*Balaenoptera acutorostrata*) and white-beaked dolphins (*Lagenorhynchus albirostris*) off Iceland

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Mark-recapture methods can be used to study free-ranging cetaceans utilizing natural occurring marks which are known however to change with time introducing one possible source of bias in population estimates. The aim of this work was to describe natural marking patterns of common minke whales and white-beaked dolphins in order to identify reliable marking for long-term photo-id studies. Photographs of common minke whales and white-beaked dolphins were collected from whale-watch boats based in Faxaflói Bay (SW coast) and Skjálfandi Bay (NE coast), Iceland, from 2002 to 2013. Each image was assigned a Quality value (Q) using the method of Gowans and Whitehead (2001) ranging from one to six (hereafter written as Q1-Q6), Q1 being the lowest. In order to describe mark types, 100 encounters per species were selected, randomly choosing one ≥Q5 photo from each of them. The size of the mark (calculated using ImageJ software and available estimates of dorsal height), shape, its location and colour were also defined. Each mark was categorized into 22 mark types and grouped into eight classes: pigmentation, injury, linear mark, patch, attachment, cutaneous elevation, tattoo-like lesion and miscellaneous. Mark abundance and prevalence were then calculated. In the common minke whales subsample 19 mark types were found (929 different marks) with blister (n=330) being the most frequent (35% of total marks) and most abundant with a mean of 11 blisters per individual. White-beaked dolphins have a total of 18 mark types (768 different marks) with black marks the most frequent (n=166; 21,6% of total marks) and most abundant with 2,12 marks per individual.
Photographs (Q≥5) of all sightings of an individual of the same side of its body in at least two different years were chosen and loss and gain rates were also estimated following the methods of Auger-Méthé & Whitehead (2007).

Poster code : ABU-5

Marine mammals hot-spot sites around Grande Comore

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The Union of Comoros is located in the northern Mozambique Channel and is part of the Sanctuary of Cetaceans of the Indian Ocean characterized by a great species biodiversity (Biodiversity hotspots for conservation priorities – Myers et all – Nature 2000) with some unique species like the coelacanth (Latimeria chalumnae, Smith 1939), and in order to preserve these endangered species in 2000 was set Marine Park of the Coelacanth. Since 2002 research programs concerning marine mammals biodiversity and species ecology have been carried out in the area, but detailed information about cetaceans' presence in the Comoros archipelago is still lacking. The aim of this study was to discover key-site in Grande Comore with high concentration of marine mammals, in order to delimitate a new Marine National Park. In 2011 - 2013, 135 small-boat surveys were carried out within 3 miles from the coast and 21 coast surveys. A total of 380 hours of direct observations were carried out in Grande Comore, the main island of Comoros archipelago. The sites were: Ouroveni, Itzunzu, Itsandra, Djoumani, Bangoi-Kouni and Ndrude. A high concentration of spinner dolphin (*Stenella longorostris*), pantropical spotted dolphin (*Stenella attenuata*) and bottlenose dolphin (*Tursiops truncatus*) were found; moreover we recorded the presence of humpback whales (*Megaptera novaeangliae*), sperm whales (*Physeter macrocephalus*), dwarf sperm whales (*Kogia sima*), and pigmy killer whales (*Feresa attenuata*). The great abundance of marine mammals and the presence of rare species in the area requires to deepen the knowledge of marine mammals abundance along the coasts in order to identify which areas should be included in the forthcoming Marine National Park and to formulate a cetacean conservation plan.

Poster code : PHOTO-2

Bottlenose dolphin abundance in the Northern Evoikos Gulf, Greece

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The Mediterranean subpopulation of the common bottlenose dolphin *Tursiops truncatus* has been classified as Vulnerable in the IUCN Red List. However, population size data are only available for a few Mediterranean subareas, hampering understanding of bottlenose dolphin status and trends. To contribute baseline information, we assessed bottlenose dolphin abundance in the Northern Evoikos Gulf, a 960 km2 semi-enclosed basin in central Greece exposed to high heavy-industry and fishing impacts. Boat-based surveys covering the entire Gulf were conducted in October 2010 and March-April 2011, totalling 3340 km of navigation over 39 survey days. A total of 54 dolphin groups were encountered (mean size 10.0 animals, SD=5.90, range 1–30, based on 84 group size samples recorded at 60 min intervals). Dolphin group follows averaged 94 min (SD=74.3, *n*=54, range 2–282 min), totalling 84 h 20 min of individual photo-identification effort across 457 km. Of 5890 digital photos taken (at 18 megapixel resolution), 3141 high quality images portraying single dorsal fins were selected. The dorsal fins of 95 individuals had natural marks allowing for long-term identification. Based on the number of photos portraying marked vs. unmarked individuals, we estimated a marked proportion of 0.92. The hypothesis of population closure was rejected by the Stanley and Burnham closure test ($\chi 2$=31.34181, df=8, p=0.0012). We therefore used an open capture-recapture model (POPAN package) in program MARK 7.1 to estimate bottlenose dolphin abundance in the study area. The model yielded a population of 100 marked animals (95% C.I.=95–106), resulting in a total population of 109 (95% C.I.=101–117). We recommend continued photo-identification effort in the Northern Evoikos Gulf and contiguous waters, for longer-term status and trends analyses.

Poster code : ACOU-2

Whistles emitted by captive bottlenose dolphins in isolation and in social groups.

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Common bottlenose dolphins (*Tursiops truncatus*), as other delphinids, produce a range of underwater vocalizations, both pulsed (echolocation click trains and various other signal types) and unpulsed (frequency-modulated communication whistles). This study examined the emissions from six captive bottlenose dolphins at Zoomarine (Algarve, Portugal), which were sampled non-intrusively in isolation and in various social situations. A total of 15915 vocalizations was extracted from 25 samples of 15-min duration, and 1027 whistles with good signal-to-noise ratio were analyzed. Their mean duration was just below 1 s and mean frequency range of the fundamental formant was between 3.9 and 9.6 kHz. A strong positive correlation was found between initial frequency and minimum frequency, and there was a clear tendency for increasing frequency modulation contours. Analysis of acoustic parameters showed significantly higher peak frequency values for whistles emitted during exploratory approaches to the hydrophone and during rest. Through visual inspection of sonograms, 780 stereotyped whistles were classified in 22 categories of frequency modulation contours. In the recording sessions of segregated individuals it was possible to identify a most-likely emitter for 421 whistles of all categories. The whistles attributed to males present higher values of maximum frequency, frequency range, duration and number of loops. Sub-adults emitted more than twice the number of whistles as the adults. Segregated animals also emitted significantly more whistles than those in social groups. Of the twenty-two contour categories we were able to assign to a most-likely emitter, six were in all likelyhood produced by all individuals and the remainder were emitted by a few of the animals in variable proportions. These whistle-type emissions were clearly independent from on-going activity, and they appear generally compatible with the signature-whistle paradigm.

Poster code : CONS-3

Determining Genotypes from Exhalation Samples of Harbour Porpoises (*Phocoena phocoena*)

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The harbour porpoise (*Phocoena phocoena*) is the most common cetacean in coastal European waters. Little is known about the population structure of this species. A fundamental problem is to obtain genetic samples from animals in the field. Here genetic analysis was made on blood and exhalation air samples taken from 11 harbour porpoises in captivity. The analysis showed that in exhalation samples were DNA and the genetic material was comparable for blood and exhalation air. These results open up for the possibility to study population genetics of this species from exhalation air samples. The method described here allows for effective DNA isolation and genetic testing, also of animals vulnerable to stress, such as newborn cetaceans in aquaria and stranded animals. The results of the analysis are comparable with the ones obtained with traditional methods, such as blood sampling. This opens up for further genetic studies using exhalation air sampling to study e.g., harbour porpoise population structure. Improvements in the isolation of samples and genetic material can further improve this method and make it even more useful for genetic and veterinarian research in this field. This may greatly facilitate nonintrusive genetic sampling in this species in the future.

Poster code : ECO-TRACE-1

Concentrations of mercury in tissues of striped dolphins indicate decline of pollution in Mediterranean open waters

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The Mediterranean is a semi-enclosed sea subject to high mercury (Hg) pollution from both natural and anthropogenic sources. With the objective of discerning temporal changes in marine Hg pollution in the oceanic waters of the northwestern Mediterranean Sea, we analysed liver and kidney from striped dolphins (Stenella coeruleoalba) collected during 2007-2009 and compared them with previous results from a similar sample from 1990-1993. The effect of body length and sex on tissue Hg concentrations was included in the analysis to ensure an unbiased comparison between periods. The Hg concentrations did not show significant sex-related differences in any tissue or period but positively correlated with body length. Using body length as covariate, Hg concentrations in liver and kidney were higher in 1990-1993 than in 2007-2009, a result that suggests that measures to reduce emissions in Western European countries have been effective in decreasing Hg pollution in Mediterranean open waters.

Poster code : BEHAV-1

On the study of Catalonian shallow waters as a foraging area for fin whales (*Balaenoptera* physalus)

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There has been an increasing interest in the fin whale (Balaenoptera physalus) Mediterranean population in recent years. Fin whales are known to migrate every year along the Catalonian coast (North-East of Spain) towards the Ligurian-Corsican-Provençal Basin. During the spring, sightings are common along Catalan coast, especially between Barcelona and Tarragona (central-south coast), which is a remarkable area for their presence. EDMAKTUB Association carried out a study of this area during the spring of 2012 and 2013. We obtained data from EDMAKTUB's visual surveys and from local commercial fisheries and recreational area users involved in the project. This information has been used to determine the presence, distribution and behaviour of this specie in the region. Preliminary results of the study are presented, giving occurrence and distribution information of fin whales in south-central Catalan coast during its spring migration. We observed travelling behaviour but also foraging activity. In addition, we detected that whales were frequently seen over shallow waters close to the coast and were re-sighted in the same area for more than two days. This uncommon behaviour has not been described before in this area. Furthermore, this and other factors as the presence of a submarine canyon producing up-welling currents, contribution of local streams or circular currents made us to develop a study of the region analysing its oceanographic characteristics that may bring on the high presence of fin whales. The results of this project emphasize the importance of this area for the migration of fin whales. For this reason, further study should be conducted in order to define the causes of the high presence and behaviours observed of whales in this region.

Poster code : ACOU-3

Using passive acoustic monitoring to assess the impact of sonar on the temporal occurrence of harbour porpoises in Broadhaven Bay, NW Ireland

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Acoustic data loggers (C-PODs) were used to investigate the impact of sonar on harbour porpoise presence in Broadhaven Bay, Co. Mayo, Ireland between 2009 and 2011. C-PODs were located at the entrance (A) and at the inner part of the bay (B), approximately10km apart. Detection positive hours (DPH) of porpoises and detection positive minutes per hour (DPM/h) of sonar were extracted for both locations and manually checked to eliminate false-positive detections. Using these data, the influence of sonar (a proxy for the presence of boats), time of day, season, year and duration to high tide on the presence of porpoises was investigated. To address temporal autocorrelation and non-linear effects of covariates Generalised Estimating Equations (GEE) were extended to GEE-Generalized Additive Models (GEE-GAM). An Information-Criterion approach was used for model selection. Duration to sunset and time of day (hour) was collinear; the former was omitted because hour substantially improved the model. The best models for both sites retained sonar, year, Julian day, and hour. High tide was omitted from both models. There was a significant non-linear seasonal (Julian day) effect for both sites, where porpoise presence peaked during winter and declined during summer. A less pronounced, but nonetheless significant, non-linear diurnal effect was identified, which varied between sites. Furthermore, the results showed a significant decrease in the presence of porpoises with an increase of sonar DPM/h for both sites (A $p = 0.015$; B $p = 0.016$). Therefore, despite clear temporal trends in the presence of porpoises over three consecutive years, there was evidence to suggest that an increase of sonar DPM/h did have a negative impact on porpoise presence. Our findings suggest that harbour porpoises, which are a species that tend to be sensitive to anthropogenic noise, are likely to be avoiding boats.

Poster code : REPRO-3

Monitoring harbour seals in the Dutch Wadden Sea: more than 50 years recorded recovery

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As a support for the management, the harbour seal in the Dutch Wadden Sea are monitored annually through aerial surveys. Since 1991These are coordinated and synchronised with the other countries bordering the Wadden Sea; Germany and Denmark. Typically three surveys are carried out during the pupping season to determine the pup production. Another two are held during the moult. These counts are used as an index for the population size.
After 1961 when the hunt for the harbour seals was closed in the Netherlands, the numbers were hardly growing. Numbers dropped below 500 animals counted. This was caused by the heavy PCB pollution impairing reproduction. It wasn't until the 1970's when the other Wadden Sea countries closed their hunt that the population, reinforced by immigration, started to grow. Shortly after, pollution ceased.
Despite the two PDV epidemics in 1988 and 2002, killing about 50% of the animals, the seals have shown a remarkable recovery. The numbers counted almost attain 8000 animals. Here we describe this recovery in numbers and distribution, highlighting the last period between 2002 and 2013.

Poster code : PHOTO-3

Stability of natural pelage marking in harbour seals over the first molts

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The largest colony of harbour seals (Phoca vitulina) along the French coast is located in the baie de Somme (English Channel). Since 1989, the non-governmental organization Picardie Nature rescues and treats stranded yearling harbour seals. Before their release, a series of pictures is taken and a flipper-tag is attached. The aim of this study is to assess the stability of natural pelage marking (ring forms and dark spots) over the first molts.
Since 1986, we accumulated a picture database from regular boat surveys conducted on the seal's colony including pictures of individuals tagged from different European Rescue Centers. Pictures of seals hauled out were taken aboard an inflatable boat at low tide. Pictures allowed identifying flipper-tag numbers from rehabilitated seals and resighted over several years in the baie de Somme. The stability of natural pelage marking was assessed on tagged seals rehabilitated by Picardie Nature, after their annual molting and over a 6-year period.
We observed no change in the distribution, the size and the number of dark spots after the two first annual molts. Specifically for seals with Waddenzee pelage, their number of rings increase with age, and the color pattern tend to be darker over the years. However, ring forms allow identifying individuals over a 6-year period.
Thus, even if most of flipper-tag numbers are not readable or disappear over the years, dark spots and ring forms are stable natural marks that allow identifying harbour seals from the birth. Consequently, we developed a standard photo-ID protocol considering dark spots and ring forms in pelage of harbour seals. This protocol will be apply on all flipper-tagged individuals from the database to study the migration, the fidelity and the survival of rehabilitated seals living in the baie de Somme.

Poster code : HUMA-3

Strandings of the common porpoise (Phocoena phocoena) in the southern North Sea : what did they die of, where did they come from ?

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Since the end of the 1990's, a strong increase in the stranding of the common porpoise has been observed in the southern North Sea. As strandings currently yield most of information about the composition of the populations of marine mammals, our study aims to refine the representativeness of the strandings as an ecological indicator of the populations at sea. Therefore, the information collected during the necropsies of 90 animals stranded during two major stranding peaks (from March 1st till May 31st 2006 and from March 20th till May 20th 2013) occurring along the Belgian and southern French coast was used. Furthermore, a first attempt to model the backtracking drift of carcasses was used to estimate the origin of the death of animals. The simulations were realized by means of the OSERIT 1.0 software (Oil Spill valuation and Response Integrated Tool). The main cause of death is by-catch, which mostly concerns the juveniles, due to the more coastal distribution of this specific age group. Additionally, most of animals died further to by-catch come from the western part of our study area. The model simulations suggested that a large part of the found animals come from waters lining the Dutch, Belgian and southern French coast. Moreover, their likely areas of origin are very wide, covering the Channel and the southern North Sea. This phenomenon could be partially explained by the current patterns, the tides and the wind, which would be the reason behind the high density of strandings on these coasts. Finally, the progressive increase of the strandings since 1990 is confirmed by our results. It would be explained in particular by the shift of the population of porpoises in the northern North Sea to the southern North Sea and by the higher incidence of by-catch since the beginning of the 2000's.

Poster code : HUMA-4

The environmental history of ambergris: Historical sources contributing to study a natural product of sperm whales

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Ambergris is a rare substance produced in the intestines of sperm whales (*Physeter macrocephalus*). It appears to result from an irritation caused by the beaks of cephalopods on which they feed. The link between ambergris and whales has been known throughout history, despite contradictory reports and fanciful explanations regarding its origin. Since ancient times, ambergris has been used for medicinal purposes and in perfumes, but its supposed exotic properties are an important reason for the European demand for this substance. Reports about ambergris from places where Europeans sailed since the 15th century are numerous and accounts for the early modern period abound with descriptions of this natural product. It is also reported on cargo lists and in merchant records and it emerged as a product traders could supply with good profit. In the 16th and 17th centuries, there were no laws dictating who owned the ambergris found on beaches, and consequently several pieces were sold or traded, legally or illegally, from the overseas to Europe. However, this product was always obtained in relatively small quantities. Much more recently, with the advent of industrial whaling dedicated to sperm whaling, conducted by several nations in various parts of the world during the 19th and 20th centuries, ambergris again acquired an importance of its own and was sold at very high prices. In the Azores (Portugal), during the 20th century, ambergris from hunted sperm whales was documented; the same applies for Madeira and the Portuguese mainland. Nevertheless being a product typically reported in whaling data and related to the economic exploitation of the sea, it is through the historical sources that its importance is clearly stated. Ambergris had great historical importance due to its typical applications and high commercial value, and also due to its spiritual and medicinal properties.

Poster code : ECO-TRACE-2

Using stable carbon and nitrogen isotopes to study dietary habits and migrational patterns of bow caught and stranded fin whales (*Balaenoptera physalus*) in the Netherlands

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Geochemical techniques, such as elemental and isotopic determinations, have been used to track the movement of both terrestrial and aquatic animals. In recent years a growing number of fin whales have been found dead in the Netherlands, including both stranded and bow-caught animals carried into Dutch ports. Understanding the origin and movements of these animals could help explain this increase and might be helpful in preventing future collisions which cause some of these mortalities. The stable isotopes of carbon and nitrogen in structures like baleens, which continue to grow throughout the animal's life, could give insights into the whale's dietary habits and migratory patterns for several years before death. In addition, for bow-caught individuals the place where the animal was found dead most likely does not reflect the place of ship collision. By comparing the isotopic signals of fin whales found in the Netherlands to animals from, for example, the Mediterranean or different parts of the Atlantic, differences in the overall carbon-to-nitrogen isotope ratio could potentially be used to define the spatial origins of these bow-caught whales. Here we will present carbon and nitrogen isotopic values of bulk biomass in baleens of fin whales (*Balaenoptera physalus*) found stranded or bow caught in the Netherlands between 2011 and 2013. Preliminary data show clear temporal variations in both carbon and nitrogen isotopes over the length of the baleen reflecting isotopically distinct feeding grounds. To complement the analysis of stable isotopes of bulk biomass, novel techniques such as compound-specific stable nitrogen isotope determination of amino acids will be used to further determine whether changes in the nitrogen isotopic signal of bulk biomass is caused by dietary changes or changes in the nitrogen source at the base of the food web.

Poster code : BEHAV-2

Changing point of view: fin whale breaching in the Western Mediterranean Sea

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Aerial displays are generally considered rare in fin whales. Nevertheless, breaching in fin whale was observed several times in the Mediterranean Sea. Many factors may determine these events and the context of occurrence is important to explain possible reasons.
In this study we investigated different aspects of fin whale's breaches, enhancing the knowledge of this behaviour. Data were systematically collected year-round in the Western Mediterranean Sea, recording cetacean sightings and weather conditions from passenger ferries along the fixed-line transect Civitavecchia (Italy)-Barcelona (Spain).
Between June 2012-October 2013 86 trips were conducted (17.440NM) and about 716 hours were travelled on effort. Fin whale was observed breaching 16 times out of 267 total sightings: 13 times in three months (June-July 2012-2013; August 2012), 3 times in October 2013. In July 2012 four breaches were recorded in two consecutive trips twice a day, far away one from the other; in July 2013 three breaches were recorded in similar position after 8 days.
Breaches represented 5-9% of all fin whale's sightings in June 2012-2013, July 2013 and August 2012, 24% in July 2012 and 30% in October 2013.
Most of the breaches were recorded in calm sea (Beaufort≤2) while, in October and July 2012, 60% of breaches occurred in higher sea state. Despite 31 fin whale's sightings in winter, no breaching was observed.
Vessel presence seemed to have no influence on animals' behavior as they were sighted at different ranges from the ferry: mean distance=2.325±1514m in 2012; 1.238±994m in 2013; 8 events recorded > 2000m away from the ship; 4 ≤600m.
Usually only one whale was observed jumping but, in 2013, mean association was of 2 animals (max=4 in June).
Social functions of aerial displays might be considered and results call for a better investigation of this behavior especially during the summer-early autumn season.

Poster code : DISTRI-2

Spatial distribution of harbour porpoise habitat in the Baltic Sea

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With the aim of predicting the spatial distribution of suitable harbour porpoise habitat in the Baltic Sea region, a GIS overlay analyses was carried out based on a literature review of harbour porpoise habitat preferences.
The literature review indicates that prey species for porpoises in the study area are mainly herring, sprat, small cod and gobies. The distribution of non-commercial fish in the region is largely unknown, however the distribution and seasonal movements of herring and cod is well studied, and spatial distribution maps of these two species were included in the overlay analysis. Harbour porpoise studies from other areas show that porpoises do respond to environmental variables such as sea surface temperature, currents and bottom topography. Hence, spatial GIS layers describing temperature, salinity and current speed were included in the analysis. Additionally, a layer describing the spatial distribution of offshore banks in the Baltic Sea region was included, since these have been identified as areas with high biological diversity and potential aggregations of prey.
Concurrent with the present-day knowledge about harbour porpoise distribution in the Baltic Sea region, the map resulting from the overlay analysis shows areas of high suitability for porpoises in the western and southern parts of the area. Additionally, offshore banks and some coastal areas further north and east also show up as potentially suitable.
The habitat preferences identified in the literature review will be used as input for the selection of covariates in the spatial modelling of harbour porpoise distribution in the SAMBAH project, which will be based on static acoustic monitoring data. The results from the overlay analysis will then be compared to the SAMBAH prediction of porpoise distribution available in fall 2014.

Poster code : ACOU-4

The SMO-KM3NeT Italy Acoustic array: technological innovation for cetacean bio-acoustics

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The Submarine Multidisciplinary Observatory is an acoustic array, installed aboard the KM3NeT experiment, whose main aim is to provide the underwater positioning of the mechanical structures. The SMO antenna was deployed offshore Capo Passero (South East Sicily) in the 23rd March 2013, about 3,500 m water depth. The KM3NeT structure hosts 10 large-bandwidth hydrophones (10 Hz - 70 kHz), two CTDs and one Doppler Current Sensor. All sensors are digitised underwater and data are sent continuously to shore via a 100 km-long electro optical cable, used also to provide power supply for the detector from the shore laboratory, located in the harbour of Capo Passero. The SMO acoustic antenna allows to monitor for a long-time the cetacean biodiversity and the underwater noise, providing feedback about conservation policies. In this work we present and discuss the first bio-acoustic results. A new semi-automatic algorithm was developed to identify the sperm whales clicks from detection data. Using this automatic software tool, it is possible assess in near real-time the size of the animal recorded and hypothesize its sex. The antenna permits tracking of the biological sound sources, thus it is possible to study the migration routes of the cetaceans recorded. Furthermore, an AIS (Automatic Identification System) dedicated receiver was installed in Capo Passero, allowing the study of correlation between measured noise levels and the ship traffic in the area. This will permit to identify the most noisy ships and to study their impact on marine mammals. In this communication we also present the dedicated algorithms developed to analyze the acoustic signals of the cetacean species present in the Ionian Sea, ranging from the low frequency calls of fin whale to echolocation pulses of Odontocetes.

Poster code : BEHAV-3

Behavioural patterns of short-beaked common dolphins (*Delphinus delphis*) in the Azores

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A variety of cetaceans species, including the short-beaked common dolphin (*Delphinus delphis*), is recorded throughout the year on the south coast of São Miguel Island, Azores. However, behavioural information regarding this species is limited. Land-based observations were performed from July to September 2013 form a lookout post at 93 m above sea level using 15x80 binoculars. A total effort of 183 hours was performed, including 47 hours of focal follows of 63 groups. Of these, 53 have been used for the exploratory analysis presented here. The median group size was 37.5 (min=2, max=700). Groups included calves and/or juveniles in 54% (N=29) of cases. Inter-specific associations with Atlantic spotted dolphins (*Stenella frontalis*) were recorded 6 times. The duration of such associations was variable, 4 to 48 minutes and mostly related with feeding activity. The observed groups of common dolphins spent 53% of time feeding, 24% travelling, 15% socializing and 6% resting. There was a significant relationship between type of activity and group size: resting tended to occur in small groups, feeding and socializing in large ones. The feeding activity also showed a higher variability for group size. On 72 occasions boat traffic was recorded in the vicinity of the groups. In 54% of the cases this resulted in behavioural change, most of which (35/39) was related to whale watching vessels. Further in depth analysis is being carried out to investigate the potential short-term effects of boat traffic on the dolphins baseline behaviour.

Poster code : BEHAV-4

Social structure of common bottlenose dolphins in the Gulf of Trieste, northern Adriatic Sea

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We studied the social structure of common bottlenose dolphins (*Tursiops truncatus*) in the Gulf of Trieste, northern Adriatic Sea. We used nine years of photo-identification data (2003–2011), collected under the framework of a long-term study of bottlenose dolphin ecology. Association patterns and standard lagged association rates were calculated using the half-weight index of associations and permutation tests within the program SOCPROG 2.4. Network analyses and visualisations were done in program NetDraw 2.123. The estimate of social differentiation S was 0.938 (SE = 0.019), indicating a well differentiated society. The mean HWI was low (0.18 ± 0.06) indicating a fluid nature of this social network, but permutation tests revealed non-random associations and presence of preferred/avoided associates. The pattern was best described by the 'constant companions and casual acquaintances' model. Average linkage cluster analysis and modularity analysis both showed a clear division of the local dolphin population into three distinct clusters with significantly higher associations within than between clusters (two-tailed Mantel test: t = 19.85, P = 1.0). The two largest clusters displayed strong bonds within them and appeared to have permanent core membership, while seldom interacting with members of the other large cluster. Individuals of both clusters were usually seen in rather large groups (>10 and sometimes containing up to 30 individuals). Mean HWI were similar among the two (0.19 ± 0.05 and 0.20 ± 0.03, respectively). Animals from the third cluster had no strong bonds among them and occasionally interacted with other two clusters. They were predominantly found in small groups (2–3 animals) or alone. They did not have particularly strong bonds with any individuals. Mean HWI (0.07 ± 0.01) was much lower than in other two clusters. We found no evidence of any sex or age segregation, nor male alliance formation.

Poster code : ECO-2

Chemical pollutions in the tissues of White Sea belugas

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Nine samples of beluga tissues from the White Sea (Onega Bay) were taken for 2011-2012. Seven of them were sampled by means of an arbalest and two were sampled from belugas carcasses (adult animal with calf – underyearling). Three classes of organic compounds: organochlorine pesticides, the polychlorinated biphenyls, and penphenes have been measured. In addition a sample taken from the calf's corpse was analyzed on the content of heavy metals.
The high levels of biphenyls (until 7742.8 ng/g of wet tissue) which are a by-product of different industries (motor transport, metallurgical, plastic production, etc.) were found. Number of unusual anthropogenous compounds that identification completely isn't finished was found in the calf fatty's tissue.
The high concentration of brominated fire-retarding agents and lipophilic organic pollutants which collect with age in an organism was measured. Noticeable levels (1.2 ng/g) of mirex was revealed as well a number of chlordans (trans-chlordan – 0.7 ng/g; oxychlordan – 29.6 ng/g). These substances were never bought and produced in Russia so their application over the White Sea coast or their input by river runoff from Europe is excluded. Mirex and chlordans were intensively applied in India and in Southern China. Probably ones enter to the Arctic Seas constantly due to global atmospheric transfer and freezing-out processes.
The heavy metals analysis of a dead calf's tissue sample showed insignificant quantity. Their concentration in muscles of a ringed seal are similar probably corresponds to the physiologically normal level.
We can't use received results for an assessment of pollution over a testing area because the belugas is a migrating animal. The high content of organic compounds in analyzed animals can testify to an unsuccessful ecological situation in the White Sea region which can influence health of belugas.
The work was supported by the International Fond of Animal Welfare.

Poster code : HUMA-5

CETACEANS OF THE EASTERN ALGERIAN WATERS: A PRELIMINARY SURVEY

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Most countries with a coastline are facing more or less regularly strandings in marine mammal alive or dead on their shores. To respond effectively to emergency situations (stranding of alive animals) and collect valuable biological and ecological data strandings of dead animals, stranding networks encompassing seafarers related directly or indirectly with marine world (fishermen, boaters, tourists, scientists, volunteers and fans) have been developed in many parts of the world. In Algeria, the Regional Network Intervention on strandings and Observations of Marine Mammals (RREOMM) was founded in 2006, making it one of the most recent internationally. The Algerian coast includes 05 departments from east to west: El-Tarf, Annaba, Skikda, Jijel and Bejaia. Although there has been little work done on marine mammals in this area since the year 2006, a number of species have been recorded from the Algerian eastern seaboard, mostly from strandings and opportunistic sightings. Amongst them, 10 have been confirmed (08 Odontocetes and 02 Mysticetes). In this paper, we will present some information on cetaceans collected during our surveys along the Algerian north eastern coast.

Poster code : HUMA-6

A Century of Strandings – 100 years of monitoring UK Cetacean Strandings, 1913-2013

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During the 19th and early 20th Centuries, the Natural History Museum, London, (then the British Museum, Natural History) was involved with global whaling expeditions, sending scientific observers with the ships. Sir Sydney Harmour recognised a need for monitoring stranded animals and collecting them in the interests of scientific study and in 1913 initiated the Whale Strandings Monitoring scheme, publishing a pamphlet for coastguards to use as an identification key should they come across a stranded cetacean.
With over 3000 specimens in the National Cetacea Collection, a significant number of British specimens came from the UK strandings scheme, which continues to contribute to the National Cetacea Collection at the NHM today.
Sir Sydney Harmer wrote in 1926 that he had never seen a stranded Pseudorca crassidens on UK shores, but that he felt this must be inevitable. Sure enough, the following year, the mass stranding and subsequent collection of 150 P. crassidens occurred in the Dornoch Firth in Scotland. This would be the only known example of a near-whole pod of the species collected worldwide. Other extralimital strandings such as two narwhal (Monodon monoceros) in the River Thames in south east England, a beluga whale (Delphinapterus leucas), and a melon-headed whale (Peponocephala electra) have been recorded over the past century.
It is noted that no humpback whales (Megaptera novaeangliae) were recorded as strandings between 1913 and 1982. Since then, there have been 19 recorded strandings of this species.
This increase coincides with the introduction of the international moratorium on whaling in 1986 by the International Whaling Commission. As a partner organisation of the UK Cetacean Strandings Investigation Programme, which began research on strandings in 1990, the Natural History Museum continues its work and now has a unique dataset which should serve as a resource for generations to come.

Poster code : CONS-4

Public perceptions of Marine Wildlife and it's Relevance to Conservation

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Support from the general public is increasingly becoming an important factor for marine conservation charities. The public's knowledge and perception of marine wildlife can directly affect their willingness to support conservation measures, such as Marine Protected Areas. This study aimed to assess the perceptions of the general public regarding marine mammal diversity in the UK. Using an online survey, 104 participants from varying backgrounds were questioned about their knowledge of marine mammals found around the United Kingdom, in particular in North West England.
The results show large variation in knowledge of marine mammal populations across particpants; most participants being aware of species such as the bottlenose dolphin and harbour porpoise. In contrast, the majority of those surveyed were not aware of fairly high profile species such as humpback whales (*Megaptera novaeangliae*) (60%) and killer whales (*Orcinus orca*) (57%) being regularly sighted in UK waters. Furthermore, it was found that when questioned about the North West of England only 30.7% of participants believed that Liverpool Bay had regular marine mammal sightings. The data from these surveys suggest a paucity of knowledge on marine mammals in the United Kingdom and even more so for the North West of England, despite a high volume of sightings within major population areas such as Liverpool and Blackpool. While this survey is not comprehensive, it indicates that current public awareness efforts are insufficient to adequately educate the general public of the range and species diversity of marine mammal species, particularly in the North West, where potentially damaging large-scale marine development is being undertaken.

Poster code : ECO-TRACE-3

Skin as a target tissue for monitoring trace element toxicity in dolphins: a case study with Mediterranean striped dolphins (*Stenella coeruleoalba*)

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In recent years, dolphins have been proposed as marine pollution sentinels because they are highly mobile and, due to their long lifespan and high position in marine trophic webs, bioaccumulate and biomagnify persistent pollutants. Trace elements generally accumulate in liver, kidney and muscle tissues although some can also be deposited in skin. However, in contrast to internal tissues, cetacean skin can be sampled using non-lethal techniques such as biopsies; taken from free-ranging individuals. Accordingly, we investigated the patterns of trace element accumulation and the degree of inter-tissue equilibrium between skin and the main internal organs in Mediterranean striped dolphins (Stenella coeruleoalba). We tested whether skin is a suitable tissue for predicting trace element concentrations in internal tissues in cetaceans by analysing the concentration of mercury (Hg), cadmium (Cd) and selenium (Se). The concentrations of Hg, Cd and Se in skin were positively correlated with the levels present in liver, kidney and muscle tissues. Thus, we conclude that skin sampling through non-lethal techniques is appropriate to assess and monitor concentrations of Hg, Cd and Se in internal tissues.

Poster code : ABU-6

Bottlenose dolphins (*Tursiops truncatus*) in Bahía San Antonio, Patagonia, Argentina: behaviour, social composition and abundance.

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A photo-identification study was performed during 33 days (2010) in Bahia San Antonio, Patagonia, Argentina, to assess the behaviour, social composition and abundance patterns of Bottlenose dolphins in this area. The total effort resulted in 14 boat-based (9 positive) and 8 land-based surveys (7 positive). From these land-based observations a sighting frequency of 0.20/h could be obtained. Results indicated that dolphins spent most of their time travelling followed by feeding and socializing. The population estimate of 66 individuals (Cl 95%=64-76) was slightly lower than the estimate of Vermeulen & Cammareri (2009, unpublished data), and could be attributed through the fact that the local abundance was not yet at its peak. The half weight index was used to determine coefficients of association (CoA) for 10 individuals that were seen ≥ 5 times in 10 encounters (where more than 50% of the individuals of the group could be positively identified). The distribution of the coefficient of associations (CoAs) was relatively high, with most dolphins showing medium to high associations. This could be attributed to behaviourally specific associations preferentially during foraging. However, the best fit model further suggested that the population of Bahia San Antonio exhibits rapid dissociations and constant companions and that preferred associations may not be stable over time lags. Further, the large variation in group size, the low modularity and the frequent change in subgroup clustering indicate that the Bottlenose dolphins in BSA are living in a fissionfusion society.

Poster code : CONS-5

A new process for developing an effective index to assess variability in cetacean presence.

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Long-term monitoring programs are essential for the implementation of effective conservation measures. The analysis of time-series provide information about natural or anthropogenic fluctuations of species presence and distribution in specific areas. Such dataset are difficult to achieve for cetaceans as surveys at sea are usually expensive and time consuming. A monitoring program for cetaceans in the Pelagos Sanctuary (PS-NW Mediterranean) has been carried out since 2009. Every summer (June-September) MMOs collect data onboard of ferries crossing the PS. In this work we used a 4-year dataset to define a process for obtaining reliable indexes to assess inter-annual and intra-seasonal variability in striped dolphin (SC) an fin whale (BP) presence in the area . We evaluated the use of two commonly used indexes: encounter rate (N sight/km) and density (N anim/km2). We tested the effect of platform type (height) and environmental variables (sea state, cloud cover, wind speed, month, latitude, longitude) by GLM and Multiple Covariate Distance Sampling, respectively. We compared the results and proposed a mixed-analysis framework according to the most restrictive parameters, in order to gain an un-biased index. Sighting distance is influenced by platform type and sea state (sea state <2 for sc and <4 for bp are recommended). For both species an east-west negative gradient is evidenced by GLMs (Coef_LongSC=-1.349e-01, p<0.001; Coef_LongBP=-9.835e-02, p<0.001), highlighting the existence of distinct sub-areas within the PS. A north-south gradient observed for bp (Coeff_latBP=-8.825e-3, P<0.01) suggested preferred distribution areas for this species. No intra-seasonal variation is evidenced for SC while BP presence increases in first half of summer and decrease in the second half. The final indexes highlight that SC population in PS is almost stable in the considered period. BP presence is characterized by strong interannual as well as intraseasonal fluctuations which should be taken into account for management purposes.

Poster code : ECO-TRACE-4

Encounters with cetaceans in Portuguese waters with clear evidence of interactions with marine debris: Information for science and tools for education

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Large marine debris, including plastic remains and fish nets, resulting from numerous human activities, are nowadays part of almost all marine environments from inshore and coastal habitats to pelagic waters. This results in hazardous and lethal encounters with large marine fauna, such as marine mammals, sea birds, marine turtles and sharks. In Portugal, attention has been recently be given to this subject with several projects related to marine debris, either scientific and educational, taking place. In this work, we present two encounters with cetaceans showing clearly the results of their interaction with marine debris. The first is a dead common dolphin (Delphinus delphis) stranded in Alcobaça in 2005 with no external trauma but which, as revelead in the necropsy, had three plastic bags in stomach including a plastic package of Portuguese cookies. This event has been used as an example in lectures and schools' educational actions, as the public in general very easily relates to the object found inside the stomach of the dolphin and connects it to a result of negative human actions in the oceans. The second event is an encounter with a minke whale (Balaenoptera acutorostrata), during a boat based survey in 2009 off Sesimbra. This animal was sighted swimming slowly at the surface, completly entangled in a fishing net, and presenting marks of the gear all over the frontal part of the body. The animal was followed and photographed until it disappeared. No stranding of minke whales with fishing nets attached was reported in the weeks following the sighting. Again, these photographs are used with educational purposes. The events recorded, even if rare, represent relevant case studies to scientifically approach the interaction of cetaceans with marine debris but also represent important educational tools for the conservation of marine environments.

Poster code : ABU-7

First absolute abundance estimates of delphinids in the southern Egyptian Red Sea

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Although the marine resources of the Red Sea are generally considered to be healthy, the pressure of anthropogenic activities is increasing, raising concerns for the conservation of cetaceans and their habitats. Major factors of concern include the natural vulnerability of the semi-enclosed basin, reliance on the oil industry, lack of information on fisheries, increasing maritime traffic, coastal population, and tourism, and climate change. The combination of these factors makes the development of conservation and management strategy imperative. Cetaceans in the Red Sea are poorly known and the lack of information on species presence and abundance is precluding assessment of population status. This work reports the first abundance estimate of delphinids in southern Egyptian Red Sea waters based on vessel surveys. Three surveys were conducted in summers 2010, 2011 and 2012 using conventional distance sampling techniques. A total of 3,702km were searched on transects and five species were encountered: *Stenella longirostris*, *S. attenuata*, *Tursiops truncatus*, *T. aduncus* and *Grampus griseus*. Abundance estimates were obtained for the two most frequently encountered dolphin species: *Stenella longirostris* 8,606 (CV=0.25) and *S. attenuata* 8,837 (CV=0.26). Some results are also presented for the other three species even if abundance estimates are not considered reliable due to the small sample size. Detection probabilities were estimated as function of covariates likely influencing the detectability. Densities of *Stenella* species were among the highest recorded from comparable surveys elsewhere. Similitude on densities was found with *S. coeruleoalba* and *Delphinus delphis* in the Mediterranean Sea, suggesting that the characteristics of the basins may influence the abundance of cetacean species present. These results are an essential first step to develop conservation measures for cetaceans in the area as strongly advised in the Regional Master Plan developed by the countries of the Red Sea region in 2002.

Poster code : BEHAV-5

Habitat use of a population of bottlenose dolphins, Tursiops truncatus gephyreus, analyzed by means of Kernel Density Estimation (KDE) method

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The San Antonio Bay (SAB), in Patagonia, Argentina, harbors a resident population of bottlenose dolphins (Tursiops truncatus gephyreus). It seems a privileged area to give birth and nurse calves. In the context of declining populations worldwide and more particularly in South America, preserving the SAB population takes a considerable significance. Yet the SAB is facing human population growth and touristic development, which represent potential threats for the dolphin population, especially dolphin-watching activities. In this context, the aim of this study was to understand the bottlenose dolphin's habitat use within the bay, and to consider how this information could be used in prospective management strategies. Particularly, we aimed at using the Kernel Density Estimation (KDE) method to map the intensity of space use for essential behavioural patterns. To this end, we collected behavioural information on dolphins during 25 boat-based surveys in the bay in 2011. The habitat use of the bay was heterogeneous: some areas were more intensely used than others. Dolphins spent most of their time traveling and diving. Variables associated to resting behaviours, e.g. school size and depth, indicated that the SAB would be a safer place compared to other known residency areas, confirming its suitability for conservation purposes. KDE analyses showed that behaviours are not evenly distributed inside the bay. Bottlenose dolphins being more sensitive to anthropogenic disturbances while engaged in resting or socializing behaviours, it is crucial to locate these behaviours. In SAB, the KDE shows that resting and socializing areas are located in the Northern part of the bay, indicating that it should constitute a priority protected area in potential future management strategies. Furthermore, our results show that the KDE method is an appropriate and advantageous tool when determining critical habitats, worth being more widely used.

Poster code : ACOU-5

Porpoise Alerting Device (PAL) Field-test of potential warning signals for harbour porpoises (Phocoena phocoena) in the Belt Sea, Denmark

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Large numbers of harbour porpoises (Phocoena phocoena) perish accidentally in coastal and high sea commercial gill-nets as so-called bycatch. Conventional pingers used for by-catch mitigation may lead to noise pollution and habitat exclusion. Our aim is to alert the animals without deterring them and to increase their awareness in the vicinity of nets using the novel Porpoise Alarm (PAL). PAL generates synthetic porpoise-like alerting sounds (SL 154db ± 2dB p-p re 1μPa at 1 m; 133 kHz ± 0,5kHz). We investigated the reaction of free-living harbour porpoises towards PAL in the summers of 2012 and 2013 in the Danish Belt Sea. We deployed 5 buoys, each equipped with a PAL and an autonomous acoustic device (CPOD) and tracked porpoise surfacing positions from land via theodolite and from the sea using observers on board the German RV "Clupea". A variety of potentially alerting signals were tested with respect to the following hypotheses: 1) PAL will not attract harbour porpoises; 2) PAL will not increase residence time 3) PAL increases echolocation activity. We found no difference in duration of porpoise presence and approach distance between active PAL and controls, indicating the signals do not attract the animals nor increase residence time: both factors would increase the chance of entanglement in a PAL-equipped net. Analysis of single events showed a wide range of reactions, such as first swimming towards the active PAL and then away; increased echolocation right after the onset of PAL- transmission, or right after the PAL stopped transmitting. One signal type led to a significant and reproducible increase in echolocation activity. This would increase the probability of the animals to detect a PAL-equipped net and potentially reduce the threat of entanglement.
Funded by the German Fed. Min. of Food, Agriculture and Consumer Protection, Grant Nr. 2819100612

Poster code : ANA-PATH-2

First report on infestation by a parasitic copepod (*Pennella balaenoptera*) in harbour porpoise (*Phocoena phocoena*) on the Southern Aegean Sea coast of Turkey

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Ectoparasites can be transmitted between individuals by contact. Pennella balaenoptera Koren & Danielssen, 1877 is a common mesoparasite species found on marine mammals. Pennellid species are found on Pinnepedia, Balaenopteridae and Delphinidae. In the third life cycle stage female copepods seek a suitable definitive host where they burrow on the host's body. They feed with blood and body fluids of their host. In the Turkish waters, harbour porpoise (*Phocoena phocoena*) is predominantly found in the Black Sea. There have been, however, several stranding reports in the Northern and Central Turkish Aegean Sea coast. An adult, female harbour porpoise (*Phocoena phocoena*) was found stranded on the Southern Aegean Sea coast of Turkey on 10 January 2013, the southmost record for this species. Body length was 141.5 cm and it was in bad nutritive condition. Thirteen ectoparasite holes were observed on the lateral sides of the porpoise. Ectoparasites were carefully collected by using forceps and fixed in 70% alcohol and 5% glycerine. Eggs were not found in preservation fluid. The copepods were identified as Pennella balaenoptera, based on their morphological characteristics and measurement. Lateral horns were cylindrical and unbranched. Mean total length was 117.45 mm, lateral horn 13.45 mm, neck 66.05 mm abdomen and trunk 51.47 mm, abdomen plumes 5.66 mm. One parasite had ovisac 71.65 mm in length. Although this parasitic copepod had been reported on several marine mammal species, this is the first report on the harbour porpoise, moreover on Phocoenid species.

Poster code : ANA-PATH-3

The first report of the isolation of Brucella ceti in long-finned pilot whales (*Globicephala melas*).

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Brucella ceti infection has been reported in cetaceans from many parts of the world in many cases only as an incidental infection with no obvious pathology. However Brucella ceti infection resulting in lesions specific to the central nervous system (CNS) has been described in only three species of cetaceans; striped dolphins (Stenella coeruleoalba) in Europe and Costa Rica and an Atlantic white-sided dolphin (Lagenorhynchus acutus) and a short-beaked common dolphin (Delphinus delphis) in the United Kingdom (UK). This poster describes the first report of the isolation of Brucella ceti in an adult male long finned pilot whale from the infected scapulohumeral joint, an incidental finding in an animal that stranded as part of a mass stranding event (MSE) in Scotland 2011. And the first report of Brucella ceti associated meningoencephalitis in a single, sub-adult male long finned pilot whale which stranded in Scotland, UK in 2013. This is the fourth species of pelagic delphinid to have CNS lesions associated with Brucella ceti.

Poster code : ACOU-6

Acoustic identification between *Grampus griseus*, *Stenella coeruleoalba* and *Tursiops truncatus* using a log-linear multinominal neural network on formants measurements

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Acoustic identification of cetacean species is very relevant for studies of population dynamics, especially when visual recognition is not possible. In this research, we determine formants of different individuals of three common species from Mediterranean waters: Grampus griseus (n=21), Stenella coeruleoalba (n=29) and Tursiops truncatus (n=31). These dolphins present a high degree of individual and specific variability that produce an overlap in sonometric information. This overlap, makes the differentiation between the three species more difficult. Also, emissions can vary geographically, seasonally and daily. We determine 17 formants in the audible area (200-20,000 Hz) that were selected for a fast detification with conventional hydrophones. The mean, minimum and maximum values of these formants were obtained for each identified animal. Therefore, the obtained matrix presents 17x3=51 acoustic parameters for the 81 identified animals. The vector of 81 species codes was compared with the 51 acoustic parameters by a Log-linear Multinomial Neural Network (LMNN). After 5000 iterations the model obtained 100% correct identifications using 22 formant parameters. This model was validated with another matrix of formants from 90 (30x3) dolphin calls of the same species. In this second case, the obtained results showed 100% correct identifications. In conclusion, we show a methodology that can be generalized for fast identification of cetacean species in conditions where visual identification is not possible or over fix net of hydrophones.

Poster code : ANA-PATH-4

Endocarditis associated with *Wohlfahrtiimonas chitiniclastica* in a short beaked common dolphin (*Delphinus delphis*)

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Wohlfahrtiimonas chitiniclastica was isolated from an adult male short-beaked common dolphin (*Delphinus delphis*) stranded dead in the Canary Islands. At necropsy the dolphin showed a severe vegetative endocarditis involving the pulmonary and aortic semilunar, and mitral valves, as well as a mild to severe multiorganic parasitosis. Main histopathological finding revealed severe, multifocal, fibrinosuppurative and necrotizing endocarditis with intralesional gram negative bacillary bacterial colonies, myocardial degeneration, and multiorganic parasitic granulomatous inflammation. *W. chitiniclastica* was isolated from blood and endocardial valvular lesions. Selected samples, i.e., lung, brain, lymph nodes and spleen, were tested morbillivirus negative by RT-PCR. *W. chitiniclastica* has not been previously reported in animals, but it has been described as a cause of fatal septicemia in humans. Despite not being uncommon in stranded cetaceans, limited microbiological studies have assessed valvular endocarditis and very few confirmed infectious agents. This bacterial agent should be considered amongst the differential diagnosis for septicemia and endocarditis in dolphins. Further studies should be implemented to shed light on the real relevance and potential pathogenicity of this microorganism with special connotation to the human and marine mammal health interface.

Poster code : ABU-8

Harbour porpoise (*Phocoena phocoena*) density, group number and calf presence at the Little Baelt from July to November 2013

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The harbour porpoise (Phocoena phocoena) is a cetacean which conservation status has been of great concern, mainly due to high levels of by-catch. Abundance estimates have been implemented though the surveys SCANS I (1994) and II (2005) in the North and Celtic Sea, and locally in the Kattegat, Belt Seas and Western Baltic by the MiniSCANS survey in 2012. Additionally satellite tracking studies have allowed identifying high-density areas which has been key for establishing MAPs. However the knowledge of porpoise's location at a small-scale is very restricted, as it is which areas are used for feeding, breeding or raising calves. Such data is important to identify key habitats to develop efficient mitigation and protection measures within the MPAs.
For this study opportunistic observations were made from a whale watching ship in Little Baelt, covering two Marine Protected Areas and adjacent waters. The 60 km2 area was surveyed during July, August, September, October and November, 2013.
A total of 470 animals were sighted during 120 surveyed hours in 23 different days. The porpoise density during July, August and September varied greatly within days, showing the need of a long-term detailed monitoring. The mean group size was 2.3 individuals, higher than previously obtained in the area, varying from 1 to 20 animals in a group. From the 209 groups encountered, 51 had calves. Calves accounting for 15% of the animals observed which may suggest a calving area. Additionally, the distribution of the animals seems to be patchy along the studied area, which shows the need of more concrete descriptions and protections within the MPAs.

Poster code : ABU-9

High definition video technique – advanced approach to offshore surveying of marine mammals

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Increasing human activities at sea require solid data on marine mammal distribution and abundance in order to balance economic activities with conservation demands. In order to obtain unbiased survey data high definition video techniques have been developed offering the possibility to cover large areas by high definition imaging with a resolution of 2 cm. A flight altitude of 1800-2000 feet allows surveying in offshore wind farms which will be closed for conventional survey flights for safety reasons. Digital aerial surveying will thus replace conventional survey techniques in the near future. However, surveying marine mammals by digital imaging is often discussed as being a challenge due to the fact that animals spent most of the time under the sea surface. In an ongoing study in the German Bight, North Sea, we conducted high definition video surveys on harbour porpoise, a small cetacean which is very common in the area. The videos provided high sighting rates of both surfacing and submerged porpoises and the techniques proves to be highly useful for surveys on small cetaceans. Sighting rates and densities of harbour porpoises will be compared between conventional visual survey method and digital video technique and the quality of the different survey techniques will be discussed.

Poster code : ANA-PATH-5

High anatomical variability of the bottlenose dolphin (*Tursiops truncatus*) sternum

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The sternum is component of axial skeleton that articulates with ribs laterally and forms the thorax. It is build of bony bilateral segments, called sternebrae. The sternebrae fuse in the median plane during embryonic development, however, in the bottlenose dolphin, the shape and degree of fusion and ossification varies widely, even in adults. Our aim was to determine anatomical variations of sternum of bottlenose dolphins (Tursiops truncatus). The sternums of 42 bottlenose dolphins stranded dead (2005 to 2011) on the Croatian Adriatic coast were studied. Juveniles (n=17) were differentiated from adults (n=17) based on degree of vertebrae fusion. Age class was undetermined in 8 animals. The sternums were thoroughly examined macroscopically, and every variation was measured, described and photographed. Four main types of variations were found. The non-fused sternebrae were found in 24 dolphins (57.14% of studied specimens) including 4 (11.9%) adult animals. The fenestrations and notches of the sternebrae were found in 29 specimens (69.05%). Ten dolphins (23.81%) had the asymmetries of most caudal part of the last sternebra. The irregularities in shape of rib facets were found in 2 juvenile males (4.76%). Only 4 (9.52%) specimens had sternum in accordance with standard description. In total, variations of sternum were found in 38 dolphins (immense 90.48%), while 24 dolphins (57.14%) had more than one variation. We presume that the openings, fenestrations and asymmetries resulted from the imperfect fusion of the left and right sternebrae pairs. However, we have no explanation for the absence of sternebral fusion in four adult specimens. These variations most likely had no effect on health of animals. Further research should explain the role of the variable sternum in the high mobility of thorax which facilitates accommodations of lung volume during diving.

Poster code : DISTRI-3

The number of gray whales (*Eschrichtius robustus*) on the feeding grounds off Sakhalin Island during 2008 – 2012.

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Over the last 15 years annual research on gray whales was conducted at northeastern Sakhalin, including lighthouse observations and boat-based photo ID surveys. From the beginning of July until the end of August working group performed observations on the whales' distribution in the coastal waters of Piltun lagoon. Shore-based scans were conducted from the Piltun lighthouse, which is located in the north of the lagoon mouth. The lighthouse is 35 m high. The records covered the water area of about 200 km2. Data collection was carried out when the visibility was not less than 4 km; only effort undertaken in Beaufort Sea State less than 4 was used. Observations were conducted by the binoculars (7x45). One unbroken observation lasted not less than 30 min. With weather permitting it was possible to conduct three surveys during one day. The overall consistency of data collection techniques maintained in 2012 allowed inter-annual comparisons to be made. In order to investigate variation in the number of gray whales sighted at the Piltun feeding area in August 2008-2012 we analyzed the value of maximal and minimal numbers at a time. In recent years, an increasing tendency of the maximal number of whales was recorded in the area at a time from 18 whales in August 2008 up to 31 animals in August 2012. The minimal number of whales also gradually increased from 1 to 7 animals (in July 2008 and 2012, respectively). Statistically the linear regression slope deviates from zero and amounts to 4.200 ± 0.9238 (P=0.0199). Apparently, there was insignificant increase in the number of whales in the area, which can be attributed to their redistribution within the whole fattening area along the northeastern coast of Sakhalin. At the same time the density of distribution was considerably higher in August in comparison with July.

Poster code : ACOU-7

Distribution and Vocal Behavior of Atlantic White Sided Dolphins (*Lagenrhynchus acutus*) in Northern Norway

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The Atlantic White Sided Dolphins (Lagenorhynchus acutus) (AWSD) are migratory dolphins and their vocal repertoire and distribution in Norway is data deficient. Boat based surveys were conducted in order to determine the occurrence, distribution, and vocal behavior of the AWSD in northern Norway from 2008-2013. Photo ID and hydrophone recordings were conducted in the Lofoten Islands, northern Norway. Describing the vocal repertoire included sound categories of calls, whistles, buzzes, and clicks. The analysis of the acoustic behavior resulted in the sound categories being context dependent in shallow and deeper water. Stereo typed whistles were also observed and described.

Poster code : REPRO-4

Satellite tagging in Reunion: new insight on the migratory movement of humpback whale within the western Indian Ocean

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La Reunion Island has become an important humpback whale breeding habitat within the southwest Indian Ocean in recent years. Regional photo-identification comparisons indicate some exchanges between Madagascar and Reunion on different years, but the level of connectivity within the breeding season is still unknown. Photo-identification studies demonstrate that although some whales remain around the island for several weeks, most individuals coming to Reunion are transient and are thought to reach other destinations during the season. The movement pattern of whales from Reunion was assessed by deploying 15 satellites tags on humpback whales in August 2013. Mean tag duration was 26.7 days (SD=18.3), with a maximum of 71 days. Except for three tags that stopped transmitting within 2-4 days, all whales, but one, left Reunion within 1 to 23 days after tag deployment. The mean time residency in Reunion territorial waters was 10.3 days. Seven whales, both males and females (including two mother with calf), migrated northwest towards Madagascar and dispersed along the east coast. Conversely, one individual headed northeast, travelling 1130 km along the Mascareignes plateau and turning back south of St Brandon shoals, where it stayed for 4 days before the tag stopped. Three individuals reached an underwater seamount located 90nm east of Reunion and remained in the area from 1 to 16 days; after which two of them reached Madagascar. Their erratic and localized movement pattern around the seamount suggests this may be an important breeding habitat for whales. These results demonstrate a high level of migratory connection between Reunion and Madagascar within the same season and suggest that humpback whales inhabit several sites within the southwestern Indian Ocean, including remote oceanic islands and underwater features that could act as aggregation points to enhance mating opportunity.

Poster code : HUMA-7

Causes of mortality of Harbour seals (*Phoca vitulina*) on the Picarde coast, France

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The harbour seals (*Phoca vitulina*) are located along the North-West French coast. France is in the south of the European distribution for this species. The Baie de Somme, in the Picardie region, receives 60% of the French total number of seals. The non-profit organization Picardie Nature studies seals and protects the colony of Baie de Somme, since 1986. Since the middle of the seventies, Picardie Nature studies and rescues all the stranded marine mammals on the coast line between Le Touquet and Le Tréport. From 1974 to 2013, about 500 animals had been stranded; most of them were harbour seals and common porpoises (Phocoena phocoena). Alive harbor seals are rescued and released in their natural environment. Measures, photos and x-rays are taken on dead seals. Depending on their state of decomposition, when they're lying on the beach, animals are autopsied by the veterinary laboratory of the Somme department. In all, 120 autopsies had been done. This poster shows the main causes of death we've seen on harbor seals. First, analysis on PCB, organochlorinated and organophosphorous are done on fat. Then, depending on the observations during the autopsy session, bacteriological, virological, parasitical and histological analysis are made. Mortality factors can be regarded in three categories: anthropic activities, natural causes and infections. One third of these factors of mortality are due to anthropic activities. Caught animals represent most of them. Then we've also seen traumatisms and foreign objects (hunter shots or hooks). Most of the natural causes of death are due to flat fishes swallowing on the wrong way, malformations and abortions. We found several infections like Brucella sp., herpes virus, influenza virus and Phocine Distemper Virus on stranded animals (alive and dead) around the Baie de Somme.

Poster code : ANA-PATH-6

Microbiological diagnostics of marine mammal's eyes pathology

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Ophthalmic diseases of marine mammals are recorded quite often. Pathologies are more likely to be observed with animals kept in captivity rather than with those living in the wild. Causation of eye diseases of different marine mammals species, pathogenesis and peculiarities of course of disease and treatment were not studied deep enough. That's why the goal of our research was to conduct laboratory diagnostics of animal material obtained from animals with eye pathology and those conditionally healthy.
Materials and methodology.
Our research was conducted at chair of microbiology at K.I. Skryabin Moscow State Academy of Veterinary Medicine and Biotechnology. The material was collected in Nemo Dolphinariums, Ukraine. Material, collected from animals living in captivity in Nemo dolphinariums chain was wipe sample of eye conjunctiva and expiratory air from two Atlantic bottle-nose dolphins (*Tursiops truncatus*) with clinically significant opthalmologic pathologies. Besides, we collected material from 10 clinically healthy bottle-nose dolphins without eye pathology, living in the same dolphinariums. In addition to that, we researched conjunctiva swabs of wild eared seal pups (*Eumetopias jubatus*), collected in 2004 on Okhotsk sea Islands Iona and Yamsky. Material was collected, transported and researched under rules of aseptics.
Microbiological studies of material were carried out under standard methodologies. Observed microorganisms were identified in accordance with their morphologic, cultural, fermentative, antigenic features, specified pathogenicity factors.
After researching all samples collected from wild eared seal pups there were found microorganisms which we identified as *Enterobacteriaceae* bacteria family, *Staphylococcus, Pseudomonas genus*, etc. We noticed that all isolates lacked pathogenicity factors.
While conducting microbiological research of eye conjunctiva wipe sample of bottle-nose dolphins with eye pathology, we revealed *Pseudomonas aeruginosa*.
Research of materials from clinically healthy bottle-nose dolphins confirmed presence of the following microorganisms: *Citrobacter, Staphylococcus, Pseudomonas, Enterobacter, Escherichia, Candida, Klebsiella*.

Poster code : ACOU-8

The effects of noise on distribution of cetaceans in the English Channel

Eleman Ayça (1), (2)

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Levels of underwater noise created by human activities have increased significantly over the past century. This pollution has become a serious concern for marine life, especially cetaceans, as they rely on sound as their principal sense. Anthropogenic noise is thought to have short and long-term effects on cetaceans, both at individual and population levels. However, our knowledge on this issue is very limited due to restrictions caused by great spatial scales and natural variations in oceans. This study aims to investigate the relationship between the distribution of cetaceans and underwater noise. A total of 225 noise measurements and 287 cetacean sightings recorded between 1998 and 2005 in the English Channel were used. Data were sourced by three bodies: the ambient noise data by the UK Hydrographic Office and the sightings data by the Sea Watch Foundation and Organization Cetacea (ORCA). The noise dataset consists of recordings at frequencies 55, 305, 850, and 1150 Hz from sonobuoys. Cetaceans were observed from elevated land stations and moving vessels. Investigation of these datasets was conducted through GIS data processing followed by statistical analysis including Pearson and Spearman correlation, and linear regression. When all data from all 8 years were analysed, significant negative correlation (above 0.01 level) is seen between the total number of individuals per cell and average noise of 55 Hz (Pearson's r=-0.753, p=0) and 1150 Hz (Pearson's r=-0.538, p=0.007), which might suggest that cetaceans are sensitive to these frequencies. However, since the data were gathered from independent sources there is very little spatial and temporal overlap between sightings and sonobuoy deployments which limits any statistical interpretation.

Poster code : ACOU-9

Seasonal distribution of the fin whale (*Balaenoptera physalus*) around the columberetes islands natural park : mismatch between data collected through sightings and acoustic detections

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The fin whale (*Balaenoptera physalus*) is the only baleen whale proved to be resident in the Mediterranean Sea. Columbretes Islands (East Spain) are geographically placed in the migratory path of these whales to the Ligurian Sea, according to Castellote et al. (2011) and Raga & Pantoja (2004). Opportunistic fin whale sightings have been recorded in the Columbretes Area since 1990. Data show an increasing number of sightings in spring (89% sightings made from March to June), decreasing gradually during winter. Passive Acoustic Monitoring Systems (PAM) have been moored around Columbretes Islands to detect fin whale vocalizations from 2009 to 2012 (sample rate 2000kHz for 2009- 2011 and 5000kHz for 2012). Results from these recordings showed fin whale vocalizations not only in the spring months, where the number of sightings were higher (96% of positive days in April and 97% of positive days in May), but also in winter (93% of positive days in November and 82% of positive days in December), when fin whales have not been recorded visually. Differences between visual and acoustic recordings are discussed based on two explanations: 1/Different emission rate of vocalizations along the year. 2/Different migratory patterns along the year.

Poster code : BEHAV-6

The role of Marine Protected Areas for monitoring marine species: the example of Capo Carbonara MPA in the Sardinia channel

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One of the main institutional goals of the Marine Protected Areas is to maintain biodiversity, focusing the attention inside the protected area but also on a wider bordering zone. The Sardinia Channel, between Sardinia-Sicily, is of strategically importance. Nevertheless, despite the presence of two MPAs at the two borders of the Channel, little information is available on the marine species living or migrating in these waters.The Capo Carbonara MPA, within the network coordinated by ISPRA to monitors cetaceans along fixed-transects in Mediterranean sea, activated a study on cetaceans along the Sardinia Channel. During June-September 2013, researchers systematically monitored 1.257 nautical miles along the Cagliari (Sardinia)-Trapani (Sicily) transect from the command deck of the Tirrenia company's ferry recording weather, anthropogenic condition (maritime traffic, marine litter), cetacean and other marine species presence. Encounter Rate (ER=sighting·10Km-1±SE), group size and distribution (ER per 5x5Km grid-cell; Kernel analysis) of species were analysed for this study. Results confirm the presence of striped dolphin (ER=0.054±0.017), sperm whale (ER=0.015±0.017), bottlenose dolphin (ER=0.01±0.005) with occasional sight of Risso's dolphin and common dolphin. No fin whale were sighted during the investigated period. Striped dolphin (mean group size=13.2) concentrated mainly along the complex bathymetry of the south-eastern Channel while sperm whale were sighted on steep areas south of Capo Carbonara MPA where a group of six animals with a calf were recorded on June 23. Bottlenose dolphin were sighted in small group (mean=2.67) close to the coasts. Remarkable the high frequency of C.caretta (ER=0.47±0.14) recorded all along the transect and the occasional sight of T.thynnus and Mobula spp.. Results confirm the importance of the area and the value of this work to improve knowledge on marine biodiversity, giving indication to MPAs to effectively manage the connection between marine species and human activity from a broader point of view.

Poster code : DISTRI-4

New insights into the habitat preferences of *Delphinus delphis* and *Stenella frontalis* in the Azores

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Species distribution modelling is a relevant tool in the management and conservation of wild populations. One of the key factors in producing a good estimate of the species distribution is to know which eco-geographic variables have greater influence in it. Here we do this analysis for two small delphinid species. A total of 43 sightings for common dolphins (Delphinus delphis) and 32 for Atlantic spotted dolphins (Stenella frontalis) were collected during a survey in July-August 2013 around São Miguel Island (Azores). Presence/absence and probability of occurrence (relative effort versus total effort) were included in a Delta lognormal GLM approach. A set of 12 environmental variables was analysed, filtered and then incorporated into the models. Effort was included as an offset factor for the P/A dataset. A simple stepwise selection based on the AIC was applied to select the best fitting models. The most important factor for the common dolphin was distance to the coast followed by distance to thermal frontal areas, the sea bottom aspect and the sea surface temperature (SST). For the Atlantic spotted dolphins the depth was the main variable, followed by distance to the coast and the SST frontal gradient density. Our results suggest a differentiation of environmental preferences between species. D.delphis seemed to be more influenced by the mass island effect as they were strongly influenced by the distance to the coast. Oceanographic features (specially SST) might play an important role on habitat selection in coastal areas for this species. On the other hand S.frontalis distribution was more related to the depth. The fact that SST frontal areas derivates were selected as explanatory variables for both species emphasizes their importance for small delphinids. This analysis is currently being expanded to include the dynamics of the oceanographic variables, and a more complete report will be presented.

Poster code : ECO-3

Tyrrhenian seamounts: the influence of morphologic variables on stripped dolphin.

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The working principles of Mediterranean static structures are complex and unknown. The ocean's seamounts and submarine canyons are stepping-stone for feeding and reproduction of many pelagic species, in particular top-predators. The importance of these structures has been recognised from the International Governance, which has inserted them in the EBSA (ecologically or biologically significant areas). This study is part of "PROMETEOS" Project coordinated by IUCN-Med (Malaga), realised by "MENKAB: il respiro del mare" association, and founding by MAVA Foundation. The project leads to provide the best available knowledge on these structures, using top-predators concentration as indicators for deep-sea biodiversity richness. The project aim is to pledge the methodology and the guide lines for evaluating offshore biodiversity through top-predators survey, as well as proposals for Marine Protected Areas designation of offshore features in collaboration with the Mediterranean International Governance bodies or national relevant administrations. Preliminary analyses carried out on a selected number of cetaceans has allowed to identify the species that show more affinity with seamounts. The striped dolphins (*Stenella coeruleoalba*) is the species more influenced from the seamount effects. The influence range that causes the aggregation is estimated within about 20 nm from the seamount summits. During the first survey "Tirreno 2013" have been realised n. 44 sightings of *S. coeruleoalba* near to Tyrrhenian static structures. The aim of this study is to relate the presence of this species with the morphological characteristics: peak deep, slope index, elevation. The results show that the seamount effect is stronger when the peak deeping is lower than 300 m, a slope index included between 0,07 and 0,43 m and an elevation included between 1800 and 2600 m. This demonstrate how the multiplicity of the mountain structures influences aggregation of this predator.

Poster code : HUMA-8

Disentangling porpocise bycatch: Interaction between areas of Yangtze finless porpoise occurrence and spatial distribution of fishing gear

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The Yangtze River is the largest river in China and one of the three largest in the world. Supporting c. 400 million people in its basin and known as the country's 'Golden channel' it has been playing an important role in China's economic development. It is also home for a variety of endemic species including one of the narrow-ridged finless porpoise's (Neophocaena asiaeorientalis) subspecies: the Yangtze finless porpoises (Neophocaena asiaeorientalis asiaeorientalis), the only freshwater porpoise population in the world. Endemic to the lower and middle reaches of the Yangtze, where it is still found, the Yangtze finless porpoise is under great pressure from threats derived from the economic development of the area: pollution, flow regulation, resource extraction, vessel traffic and fisheries bycatch. Although all of these threats have been known for a long time, none has been quantified and their impact on the rapid finless porpoise decline is unknown. From these threats, boat collisions and fisheries bycatch are causes of direct mortality. This project aims to assess the impact of the direct mortality causes on the Yangtze finless porpoise population status. Using data collected on an independent ship survey conducted in the main channel and two interview surveys to fishers across the porpoise's distribution range, i.e. the Yangtze main channel downstream the Gezhouba Dam, Dongting Lake and Poyang Lake; this project has shown that cargo vessels and fishing gear are not playing a role as big as expected, and identified areas on a transversal transect where porpoises might be more vulnerable.

Poster code : BEHAV-7

Occurrence of sperm whale (*Physeter macrocephalus*) social units off North-Eastern Sardinia (Central Tyrrhenian Sea)

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It is well-known that female and immature sperm whales (*Physeter macrocephalus*, Linnaeus 1758) form stable social units, to protect the calves and to allow mothers foraging. We present three records of social units occurred in 2010 and 2013 during an ongoing project focused on pelagic cetaceans in the central Tyrrhenian Sea. The sightings occurred in the Caprera Canyon area, located off north-eastern Sardinia, north of the 41° parallel that is a particularly productive area outside the South-eastern border of the Pelagos Sanctuary. Visual surveys were conducted using a whale watching catamaran as platform of opportunity. Data were collected only by one-day visual surveys and included boat coordinates, sighting positions, photo-identification and weather conditions. The first social unit was sighted on July 21, 2010, 40Km off NE-Sardinia, in a 770m deep primary position. The group size was estimated of 6 individuals, one of them was a 5-6m calve. On July 17, 2013 a second social unit was sighted, 44Km off the coast, to a depth of 836m. Group size ranged from10 to 13. The third sighting occurred on July 26, 2013 and water depth was 653m. The unit size was of 11 individuals. Both sightings were with several calves. The social units displayed different behaviours during the sightings: in 2010 the animals were on surface, very close to one another, while both the 2013 sightings the sperm whales were dispersed with different dive time and surfacing. Photo-identification allowed us to verify that each sighting represented three distinct social units. The group sizes observed were bigger than reported for the Mediterranean Sea. All the sighting occurred on summer, probably due to the increasing of Sea Surface Temperature. These data are important if considering that the Mediterranean sperm whale stock is classified as “Endangered” by the IUCN.

Poster code : ANA-PATH-7

In vitro culture of seal muscle-derived satellite cells

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Over the last decade, adult stem cell populations from various tissues have been identified in humans and animals. In particularly, muscle-derived satellite cells (MDSCs) have received a great attention due to their involvement in the repair process after injury. The self-renewing of the MDSCs maintains the stem population and provides myogenic cells, which are able to proliferate, to differentiate and to fuse to form myotubes.
The aim of this study was to determinate if it was possible to isolate and cultivate MDSCs from a marine mammal, precisely a seal. A sample of dorsal muscle from a female juvenile seal (Phoca vitulina) was collected 2 days after death and preserved for 2 days at 4°C in Dulbecco's Modified Eagle's Medium supplemented with 10 % fetal bovine serum. Based on the methodology applied for the bovine MDSCs we were able to isolate and culture the seal MDSCs. Immunofluorescence staining showed that satellite cells expressed the paired box transcription factor Pax7, a specific marker of muscle precursor cells. To the best of our knowledge it is the first time that MDSCs from Phoca vitulina were isolated and cultivated. The opportunity to grow primary muscle cells from marine mammals opens new avenues for the study of metabolic adaptations to restricted oxygen supply during long and deep dives. Comparative approaches of the physiological and biochemical responses of marine and terrestrial animal primary muscle cells grown under different experimental conditions will be the next step to better understand the molecular physiology of dive.

Poster code : CONS-6

Remarkably low genetic diversity and hierarchical population structure in common bottlenose dolphins (*Tursiops truncatus*) from coastal waters of the Southwestern Atlantic Ocean

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Knowledge about the ecology of bottlenose dolphins in the Southwestern Atlantic Ocean is scarce. Increased by-catch rates over the last decade in coastal waters of southern Brazil have raised concerns about the decline in abundance of regional dolphin communities. Lack of relevant data, including information on population structure and connectivity, have hampered an assessment of Brazilian bottlenose dolphin communities conservation status. Here we combined analyses of 16 microsatellite loci and mitochondrial DNA (mtDNA) control region sequences to investigate genetic diversity, structure and connectivity in 124 biopsy samples collected over six communities of photographically known coastal bottlenose dolphins in southern Brazil, Uruguay and central Argentina. Levels of nuclear genetic diversity were the lowest ever reported for bottlenose dolphins (mean values of allelic diversity and heterozygosity across all loci were 3.6 and 0.21, respectively), a result that possibly reflects the small size of local communities. On a broad geographical scale, remarkably strong and significant differentiation was evident between bottlenose dolphins from southern Brazil-Uruguay (SB-U) and Baia San Antonio (BSA), Argentina (AMOVA mtDNA ΦST = 0.43; nuclear FST = 0.46), with negligible contemporary gene flow detected between them based on Bayesian estimates. On a finer scale, moderate but also significant differentiation (AMOVA mtDNA ΦST = 0.29; nuclear FST = 0.13) and asymmetric gene flow was detected between five neighbouring communities in SB-U. We propose that BSA and SB-U represent two distinct Evolutionarily Significant Units (ESUs), and that communities from SB-U comprise five distinct Management Units (MUs). Under this scenario, conservation efforts should prioritize the areas in Southern Brazil where dolphins from three MUs overlap in their home ranges and where by-catch rates are higher.

Poster code : ACOU-10

Potential effects of whale watching on common dolphins in the South coast of mainland Portugal

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Since the 1950s, whale watching industry has been growing in Portugal mainland. This business brings several economic benefits and it can even be a good tool for scientific research on cetaceans, despite the threats it might pose to target species. The South coast of Portugal is one of the main whale watching spots in the country. Presently, there are 19 licensed companies to do whale watching, and 31 vessels working in this area. With the business development the question is "May this industry affect the target species?". Common dolphins, Delphinus delphis, Linnaeus, 1758, were used to verify if whale watching vessels affected the immediate response of the animals. Surveys were carried out onboard opportunistic platforms, corresponding to a total of 100 hours of effort and 33 encounters with common dolphins. When less than three boats were present, the animals tended to approach the boats. When a single vessel was present, individuals approached in almost half of all encounters. However, whenever three or more vessels were present the majority of the dolphins exhibited an evasive response. It was also observed that by the end of the day the frequency of evasive responses increased. Tourism operators must be aware of this issue in order to be part of its solution. Additionally, it is highly important too, to enforce the law in this area.

Poster code : ABU-10

Simulating deep-divers visual detection rates

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Visual detection of long-diving cetaceans is always subject to randomness, since a survey boat can easily sail above these cetaceans during their diving phase. Intuitively, we could suppose that the detection ratio of a cetacean is closely related to its surface/dive time ratio and also linked to platform speed. We studied both aspects of the detection process with a simulation based on experimental surface/dive cycles; the software was written with Matlab. Fixed parameters were: the number of observers, the effective detection radius, the environmental conditions, the school density. We ran the simulation for a fixed transect with random cetacean distribution, and whales were assumed to be static on the x,y plan, with a realistic surface-dive cycle. Boat speed was set to vary from 1 m/s (about 2 knots) to 15 m/s (about the speed of a fast semi-rigid boat). We compared the detection ratio defined as the number of school detected divided by the number of school present within the survey strip. Averages and variances were obtained with 10,000 runs of the simulated transect. This simulation was carried out with three whale "categories": a short-diver (fin whale, surface/total time ratio = 14%), a regular deep-diver (sperm whale, 20%), and a deep diver with complex dive cycle (Cuvier's beaked whale, 10%). Two results were particularly interesting : First, we could see that a boat cruising at 1m/s detect sperm whales and Cuvier's beaked whale with the same 47% ratio, but that ratio decreases to 11% for the CBW when going 15m/s while remaining at 21% for the sperm whale. Secondly, whereas the 15m/s ratios for the sperm- and the fin whale are alike (21% and 19%), the fin- 1m/s ratio is almost the double than the sperm whale's one (90% vs 47%). Various parameters were simulated to provide a discussion basis.

Poster code : ECO-TRACE-5

Persistent Organic Pollutants (POPs) levels in blubber biopsies of free-ranging Bottlenose Dolphins (*Tursiops truncatus*) collected in 2003-2011 from the Canary Islands, North Atlantic Ocean.

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The impact of anthropogenic pollution in marine mammals worldwide has become an important issue due to the high concentrations found in many areas; the present information represents the first study of pollutants in free-ranging cetaceans from the Canary Islands. The concentrations of 18 polychlorinated biphenyls (PCBs), 23 organochlorine pesticides (OCPs), and 16 polycyclic aromatic hydrocarbons (PAHs) were determined in 64 blubber biopsy samples collected from 2003 to 2011. The preliminary results show that PCBs and dichlorodiphenyltrichloroethanes (DDTs) were predominant with a median concentration of 30783 (P5=4502 – P95=479081) and 24236 (P5=1723 – P95=531001) ng/g lipid basis (lb) respectively. Median OCP level was 57104 (P5=11004 – P95=560385) ng/g lb. We found a pp´-DDE/∑DDTs ratio of 0.76, which is a common indicator of DDT degradation. PCB congeners 180, 153 and 138 were the predominant and represents the 82% of the total burden of PCBs. Among the polycyclic aromatic hydrocarbons (PAH) analyzed, phenanthrene was the highest compound followed by pyrene and naphthalene. Median concentration of PAHs detected was of 13598 (P5=2526 – P95=35864) ng/g lb. The main objective of this study was to gain an understanding of the toxicological status of resident populations of the Canary Islands. These preliminary results revealed a significant level of POPs in the biopsies collected, as it was showed in previous data of stranded bottlenose dolphins from the same area. Further studies in Canary Islands are needed to contribute to the conservation of the marine environment.

Poster code : ABU-11

CetAVist

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The Canary Islands are located in the subtropical region of the Atlantic ocean. Due to their geomorphological and oceanographic conditions, the diversity of cetacean species is among the highest in the world. In concrete, 30 out of 90 existing species have been recorded in the Archipelago. This number includes resident, seasonal, migratory and vagrant species. In 1999, big fast ferries started to operate between islands. Since then, strikes with several species have been reported. As usual in pelagic species, there is an important lack of data about phenology, distribution and density of cetacean populations, making hard to design management programs focused on their conservation. The University of La Laguna (Tenerife, Canary Islands) and two of the fast ferries companies have signed a collaboration agreement known as CetAVist. CetAVist is a monitoring program consisting in a web of volunteer observers aboard the ferries in charge of taking both abundance and behavioral data of seabirds and cetaceans. The project took off in December 2012 and is still working. Up to the date, 219 volunteers have participated, making 129 transects around the entire Archipelago, what leads to 155 hours of effort. Nine different species of cetaceans have been reported .Four of them have been seen all-year-round, including short finned pilot whales, sperm whales and it is expected that CetAVist could provide much more information about the seasonality of the rest of species, which is unknown until now.
CetAVist is a comprehensive project which cover a wide spectrum of pursues, being an educational Marine Biology tool, as well as the way to discover the keys for determining protected areas relevant to cetaceans in the Canary channel waters.

Poster code : ACOU-11

Lost in translation - how does calibration help?

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C-PODs are commonly used in monitoring, EIA and research programs throughout Europe. In contrast to the T-POD, its successor, it is has been shown that its detection range is very similar within and between versions. Nevertheless, concerns arose about the comparability and the detection range of an individual C-POD, hampering the explanatory power of the study results. Consequently, the 'Standard for Environmental Impact Assessment' of offshore wind parks in the German EEZ demands the calibration of C-PODs and the incorporation of the results into the analysis. In a joint research project financed by the StUKplus project the implementation of these new requirements were tested.
All C-PODs were calibrated at the German Maritim Museum (Dähne et al. 2013) between 100 and 140 kHz. The calibration results constitute a sound pressure mapping function that aligns the unreferenced SPL values stored by the C-POD with the dB-values (re μPA) measured during the calibration experiment by a gauged hydrophone.The calibration results can be incorporated either by filtering undertone clicks directly while processing the C-POD-data or on the level of a train. The feasibility of these approaches has been tested on an exemplary dataset. The influence of calibration results was tested on the level of the train and of the pp10m/day (Generalized Additive Model). The consideration of the calibration data didn't change the ecological conclusion of the model, but improved its quality (CV: -12.1%; explained deviance: +1.5%). The importance of calibration data within a statistical analysis may be higher, if the scale on a spatial or temporal plane is smaller. Thus, the meaningfulness of incorporating calibration data should be checked individually for each case. Due to the difference in sensitivity between the two C-POD versions it is advised to use only one version per study or to account for it in the data analysis.

Poster code : ANA-PATH-8

Ecomorpholgy of the vertebral column: preliminary study

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Ecomorphology is the study of the relationships between functional design and the environment. One of its aims is to understand how the environmental factors can constraint the performance of an organism or act on its phenotype. Different studies have already showed in different cetaceans that the number and shape of vertebrae can reflect the stiffness of the body and consequently can impact their swimming mode. The aim of this preliminary study is to establish relationships between characteristics of the vertebral column of different cetaceans and their ecology. To this purpose, we have studied meristic and morphometric data on the vertebrae (centrum length, height and width, neural and haemal spine height and the transverse process length) in different species of mysticetes and odontocetes coming from the Aquarium-Museum of Liège and Royal Institute of Natural Sciences of Bruxelles. Preliminary results allowed the distinction of two morphotypes. The first one comprises smaller species that are characterized by a high number of vertebral counts, short centra and an important regionalization of the backbone The second group contains larger species which possess less vertebral counts, longer centra and without a great column regionalization. These differences should be related to different swimming modes and reflect the different ecological behaviours of the studied cetaceans.

Poster code : ECO-TRACE-6

PCBs, DDTs, PAHs and toxic element concentrations in Stenella coeruleoalba dolphins from the Ligurian Coast of Italy (2008-2012).

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Cetaceans, top predators in the marine ecosystem, are characterized by a limited capacity for metabolizing persistent organochlorine pollutants, compared to land mammals and birds and they tend to accumulate high levels of these compounds , along with heavy metals and polycyclic aromatic hydrocarbons (PAHs), up through the food web (Marsili et al. 2001; Shoham Frider et al. 2009). Environmental contaminants are carcinogenic and immunosuppressive agents able to induce pathological effects in mammals (Dorneles et al. 2013). In this study we report levels of Pb, Cd, Cr and Hg, from muscle, liver and kidney of 22 Striped dolphins (Stenella coeruleoalba) found stranded along the Ligurian Coast between 2008 and 2012. Analysis for PAHs, PolyCloroBiphenyles (PCB) and organochlorine pesticides were also carried out.
Pb and Cr presented maximum concentrations of 0.03 mg/kg and 0.04 mg/kg , respectively, without any preferential accumulation in the organs investigated. The highest Cd concentration was observed in the kidney (0.41±12.10 mg/Kg), followed by liver and muscle, while Hg highest values have been detected in liver (1.79±217.71 mg/kg). A finger print of 6 PAHs has been evaluated and pyrene was the most commonly found in subcutaneous blubber. Animals stranded in years 2008 and 2009 presented the highest values, with the maximum concentration reported of 151.9 ppb.
PCB 138, 153, 180 and all congeners with six or more chlorine atoms substitution were the most concentrated, among the 18 PCBs congeners analyzed, both in muscle and blubber tissue.
4.4'-DDE, followed by others DDT metabolites were the organoclorine pesticides detected the most , in the blubber. High DDE values, along with a high DDE/DDT ratio confirm the decline of the use of DDT in the Mediterranean basin.
These results indicate that cetaceans are useful indicators in monitoring, in the long-term and large geographic scale, the aquatic environment.

Poster code : DISTRI-5

Cetaceans in the coastal South-Eastern Crimea

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Coastline between Demerdzi River creek in Alushta and Meganom Cape near Soudak is a very specific part of the Crimea, including its unique biodiversity and fish-cetacean migration paths, low density of rural population (except of recreational season), flashpacking, intensive boat traffic in summer and fishery. The materials obtained from polling of 3,400 university students, local residents and volunteers (131 of respondents are residents of this area) in 2002-13, and some field excursions in 1997-12 were analyzed; 417 sightings and 117 strandings were reported. Harbour porpoises, bottlenose and common dolphins were observed in the different parts of coastal area, but the most of sightings/strandings were recorded in Soudak and Capsel Bay (35.2%/19.7%), Alushta (4.2%/9.4%), Novy Swet Bays (11.1%/5.1%), strips between Anduz River and Avun Cape (5.9/6.8%), and Aunlar Area and Ay Phoca Cape (9.1%/16.2%), regions of Uskut River (7.9%/8.5%), Orta Uzen River (6.2%/12.0%), Eastern Ulu Uzen River (4.3%/8.0%) creeks; Sotera (5.2/4.3%) and Meganom Capes (5.0%/2.6%). Two cases of albinism were reported, one white individual in a herd of 10-11 animals (Shelen River creek, August 2010), and in a herd of 20-30 animals (Kapchik Cape, April 2011). Cetaceans escorted boats and ships in 18.2% cases of sightings. Bottlenose dolphins dominated in sightings (47.8%), while harbour porpoises dominated in strandings (60.0%). Cetaceans occurred all the year round; sightings/strandings were registered mainly in summer (78.7%/68.7%), but also in spring (9.3%/17.1%), autumn (7.8%/12.8%) and winter (0.2%/5.1%). Winter occurrence was recorded in Soudak, Meganom Cape, Orta Uzen and Shelen River creeks, etc. Annual dynamics of sightings and strandings demonstrate some fluctuations. The highest peaks of sightings/strandings were observed in 2003 (7.9/9.6%), 2006 (11.5/16.7%) and 2009 (8.4/11.4%). Findings of deep incised wounds on the dorsal side of carcasses were recorded (35.9% of strandings). Cases of by-catch and economic using were reported by anonymous local people.

Poster code : ABU-12

Temporal and spatial distribution of the common dolphin (*Delphinus delphis*) in São Miguel, Azores

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The Common dolphins (Delphinus delphis) is one of the resident species of cetaceans in the Azores. The aim of this study is to look for intra and interannual differences in the temporal distribution of the common dolphin. We also observed a relationship between spatial distribution and sea surface temperature and depth. This is the first step to better understand the distribution of common dolphin according to environmental features. This is important because it is one of the species that enhances the whale watching activity all year long, improving economic incomes in the Azores. Data used in this study was gathered off the south coast of São Miguel (Azores) between 2009 and 2011 during the commercial trips of a whale watching company. We analysed the temporal distribution of common dolphins and observed the relationship between their spatial distribution with sea surface temperature and depth. We registered 3090 sightings during the study period. From those 530 were of the common dolphins. Therefore this species has been the most sighted of the 18 registered species. 58,7% of sightings were registered within a sea surface temperature range of 16/17,5`C, (typical winter sea surface temperature). Depths registered most frequently (77,4%) were under 700m. In 2009, the number of sightings and the size of the group were approximately double that of the following two years. Intra and interannual differences of temporal and spatial distribution could be due to several factors; fish stock, temperature changes or chlorophyll concentrations. Our investigation will continue studying these relationship to get a better understanding on cetacean distribution around Azores and its relationship with biotic and abiotic factors.

Poster code : CONS-7

Marine Mammal Rehabilitation in Europe

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As it is both a growing concern in public opinion and a profoundly humane action taken on our surrounding environment in need, marine mammal rehabilitation is a strongly motivated cause. It is though a relatively recent activity in the scientific research field, and its realities remain poorly known, as these animals represent samples of existing wild populations of the nearby area and hence a source of quality data, but are intended to be released in the best condition reasonably attainable. There seems to be a legitimate balance between the scientific community and the concept of rehabilitation, by seizing the opportunity of acquiring data on wild born specimen, and care for them at the same time, to be later released. There is only little information available reviewing what is going on in the numerous marine mammal rehabilitation centers along the European coast. Through an extensive confidential survey sent to several marine mammal rehabilitation centers focusing on key points, we were able to find different common issues and practices along with particularities throughout European care centers. This work aims at circumscribing the state, limits and expectations of this very specific, yet multidisciplinary activity based on the answers gathered with this survey. Conclusions point out that there is still no standardized protocol for rehabilitation in Europe, and a comprehensive widely agreed common protocol could help attain better results along with stable funding.

Poster code : ANA-PATH-9

Hair cortisol as a parameter for stress assessment in harbor seals

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Determination of stress in wild animals includes several problems. So the handling and collection of blood itself already represents a stressful event. Therefore, there is a need of non-invasive techniques which ideally are unaffected by sudden changes of the situation. Another advantage would be the accumulation of the so-called stress hormones (e.g. cortisol) before trapping and handling. In the present study we hence measured cortisol in hair and vibrissae as a possible technique for stress assessment in harbor seals.
Vibrissae and hair samples were collected from dead seals by the stranding network in Schleswig-Holstein during necropsy. The hair samples were taken from different body region (neck, lower abdomen, fluke) because of comparison reasons. Additionally, hair samples were taken from animals during a health monitoring program in the North Sea in autumn 2013.
Vibrissae and hair cortisol concentration were analyzed in the Institute of Doping Analysis and Sports Biochemistry Dresden. Hair samples were measured in total, vibrissae were dissected in 3cm-units.
Hair was decontaminated with a methanol-water mixture. Afterwards cortisol concentration was determined using a liquid chromatography with tandem mass spectrometry (LC-MS/MS), a method already established in human doping analysis (Krumbholz et al., 2013).
Cortisol could be detected in every hair sample to a varying extent. Washing solutions of uncontaminated hair did not contain any investigated analytics indicating that cortisol is incorporated in seal hair rather than attached to cutaneous sebum. Additionally, cortisol was also detectable in vibrissae from dissected harbor seals, with supreme values in the proximal end.
In summary, measuring cortisol in hair and vibrissae may be a good tool in situation-independent stress evaluation in captive and wildlife population. It also represents an opportunity of post mortem examination concerning dead found seals. However, cortisol concentrations differed between body parts and therefore should be taken from different regions for comparison.

Poster code : DISTRI-6

Estimating the spatial position of marine mammals using land-based HD digital camera recordings

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Estimating the spatial position of organisms is essential for ecological and behavioural studies. It allows researchers to identify interactions between the organism and characteristics of its surroundings, e.g. predator-prey interactions, selection of habitats and social associations. Because marine mammals spend most of their time under water, and may appear at the surface only briefly, determining their exact geographic location is challenging. In this study we illustrate how a low-cost photogrammetric method can be used to determine the spatiotemporal fine-scale distribution of the elusive harbour porpoise.
HD video recordings of harbour porpoise sightings in a tidal inlet were made from land, using a standard digital single-lens reflex (DSLR) camera, positioned at a height of 9.59m above sea level. Landscape features (e.g. buildings) with known geographical coordinates on the other side of the inlet (visible on the recordings) were used to define the distance and bearing of the sightings. A set of R functions was written to process the images and obtain geographical coordinates of the porpoises.
Porpoises were detected up to a distance of 1837m (mean 544m, mean location error 12m). The method presented in this study allowed for multiple detections of different individuals within a single video frame, and for tracking of the movement of individuals based on repeated sightings. Porpoise locations were plotted on a bathymetric map to illustrate the potential of estimating fine-scale habitat selection.
One of the main advantages of the method presented in this study, is that it only requires a camera to make accurate position estimates of marine mammals making it very cost-efficient. Particularly when such studies are carried out in regions with ample data on local (a)biotic conditions, the resulting fine-scale distribution in space and time can be used to resolve the functional mechanism behind habitat selection in marine mammals in coastal areas.

Poster code : BEHAV-8

Influence of abiotic factors of harbor seals' (*Phoca vitulina*) haulout behaviour in the *Mont-Saint-Michel's bay*, France.

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We estimated the influence of biotic and abiotic factors on the haulout behaviour of harbour seals in the Baie du Mont Saint Michel, France, hosting the southernmost colony of the species in the northeast Atlantic. Eight seals were tracked by Fastloc GPS/GSM tags outside the moulting and reproduction periods from January 2006 to April 2008. Weather conditions, such as temperature, wind speed or precipitations are known to potentially influence seals' haulout behavior. We tested these factors on i) the presence/absence of seals on land and ii) the time spent hauled out per tide, using GAM. The distance travelled between haulouts was included in the second model to evaluate the influence of the at-sea activities. Seals spent 19% of their time hauled out. A peak of haulout occurred from 11am to 5pm, during low tides. The deviance explained (DE) by the first model was 25%. Haulout model was mainly explained by tide (39% of the DE), season (20%) and time of day (14%). Solar elevation, sun exposure and temperature were positively correlated to haulout while wind speed had a negative effect. The DE by the second model was 45%. Season and time of day accounted for 37% and 31% of the DE respectively. The abiotic factors had the same influence as in the first model. Seals spent less time hauled out after pupping and moulting periods, optimizing foraging for blubber reconstitution. This was consistent with a positive relationship between distance travelled between consecutive haulouts and time spent on land. The influence of abiotic factors is likely to be explained by the need for thermoregulation. Given the high tidal range in the study area (14m) and the fact that haulout sites are only available at low tide, we expected tide to have a stronger influence in the seals' haulout behaviour.

Poster code : ANA-PATH-10

Pathology in stranded seals in the southern Wadden Sea and North Holland province, The Netherlands, 2009-2013

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In recent times, populations of marine top predators have grown dramatically in the southern North Sea. Long-term monitoring of seal numbers in Dutch waters proves particularly useful to describe this change. However, there is still very little knowledge on the factors driving this growth, or potentially limiting this through mortality. Between 2009 and 2013, 169 seals were submitted for postmortem examination (Harbour seal, Phoca vitulina n=132; Grey seal, Halichoerus grypus n= 19; unknown n= 18). All animals stranded on the Northwestern coasts of the Netherlands, including the island of Texel. The seals were found dead, or died within 24h after being taken into rehabilitation, although no animals in this study received treatment. At stranding, species, location and date of stranding were recorded.
All animals were subjected to an extensive standard necropsy protocol including measurements of biometrical data, photography, macroscopic examination, nutritive condition code (NCC), decomposition code (DCC) and scored for likelihood of bycatch. Depending on DCC, samples were taken for histopathology, parasitology, and bacteriological culture. Samples were also collected for a tissue bank and for future study in diet composition, toxicology, age determination and stable isotopes. For every individual, pathological lesions were evaluated and the most likely cause of death was determined.
Here, a first analysis of the data is presented, including an overview of the prevailing diseases, affected organ systems, and the most important causes of death. This is compared to the spatial, temporal and age distribution of the necropsied animals including local population size and recorded strandings of all seals (including those that were not presented for necropsy). Results are also compared to previous studies. Possible anthropogenic factors and importance of found diseases for the further development of the population will be discussed.

Poster code : BEHAV-9

Behavioral criteria for releasing Indo-Pacific bottlenose dolphins: Aquarium and sea-pen studies

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As a part of a reintroduction project in Republic of Korea, we observed three Indo-Pacific bottlenose dolphins, named Jedol, Sampal, and Chunsam, who were illegally traded after being caught in fish nets off the coast of Jeju Island. They had been at the aquarium since 2009 and were released back into the wild in July 2013. The aim of this research was to understand behaviors of captive Indo-pacific bottlenose dolphins, necessary for evaluation of behavioral and ecological criteria for cetacean release. We recorded the frequency and duration of all behaviors of Jedol that occurred from Dec 2012 to April 2013 in Seoul Grand Zoo and of all three individuals that occurred from April 2013 to July 2013 at the sea-pen in Jeju Island. Behaviors observed included breathing, traveling, resting, social interactions, feeding, and etc. In results in the zoo, the percentages of traveling and resting were lower and higher, respectively, than those of the wild population. The activity budget of Jedol in the aquarium seemed to be intermediate between the wild populations and the aquarium individuals without any show. In the sea-pen, percentages of breathing, surface resting, and diving behaviors of three dolphins were almost always within ranges of wild populations. The efficiency of prey capture increased with time in the sea pen. However, the level of affinity to human also increased with time in the sea pen. Based on changes of behaviors from the aquarium to sea-pen settings and based on the comparison of behaviors between the sea pen and in the wild, we decided to release the dolphin to wild on 18th July 2013. Currently, all three dolphins appear to successfully reintegrate their original population off the coast of Jeju Island

Poster code : ANA-PATH-11

Bite injuries of grey seals on harbour porpoises: the DNA proof

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Bite-like skin lacerations on harbour porpoises (*Phocoena phocoena*) have been suspected to be caused by the predation by grey seals (*Halichoerus grypus*). The bite injuries observed had two aspects: large flaps of skin and blubber missing with frayed edges, and pinhole lesions. Both lesions had been unequivocally inflicted antemortem, as judgetfrom their hemorrhagic nature. Nevertheless, the grey seal predation was not definitively demonstrated. Stranded dead porpoises with bite-like skin injuries were selected and sampled for genetic investigations. Samples of both bite-like injury lesions have been swabbed and frozen (-20°C). In addition, head of a recently dead grey seal was used to mimic bite-like skin injuries on a porpoise carcass. Subsequently, the artificial skin injuries were swabbed too, along with the gum of the seal used for inflicting them. (positive controls). Total DNA was extracted from the swabs and was used to retrieve a fragment of mitochondrial DNA by PCR. Primers were designed to amplify a specific stretch of mitochondrial DNA known to differ between grey seals (249 bp) and porpoises (224 bp). The amplicon targeted was successfully amplified from all samples and then sequenced. The grey seal-specific mitochondrial DNA was retrieved from all swabs i.e. from the gums and mimicked skin injuries (positive controls) and from the suspected lesions. We conclude (1) that it is possible to detect grey seal DNA from dead porpoises even after several days in seawater and (2) that bite-like skin lesions found on dead porpoises in our context result definitively from grey seals attacks. The cause of such attacks remains unclear, likely linked with predation, although aggressive behaviour cannot be excluded.

Poster code: ANA-PATH-25

Fatal plastic impaction in a minke whale (*Balaenoptera acutorostrata*)

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On 10 March, 2013, a minke whale (Balaenoptera acutorostrata) was found dead on the beach of Nieuwpoort, Belgium. The animal was necropsied the day after and sampled following a standard procedure. The whale was a juvenile male of 3.4 m and an estimated weight of 400 kg. It was very fresh (conservation code 2) with hemorrhagic skin abrasions suggesting that it had stranded alive. The nutritional condition was poor (severe emaciation) with vertebral processes prominently discernible and a concave aspect of the dorsal muscular masses indicative for severe amyotrophy. The blubber thickness measured 24 mm. The main findings were anemia, subcutaneous edema, hydropericardium and hydroperitoneum (ascite) and edema around coronary vessels. Both lungs were uniformly congestive with a severe pulmonary edema. The size of the stomach was reduced and the gastric lumen in the fundus was filled with four compacted plastic items (400 g wet weight). The plastics bags were clogged tightly together at the junction with the third stomach, occluding the pylorus and responsible for an obstruction or impaction. The severe emaciation is believed to be associated with the gastric impaction responsible for a prolonged starvation. In baleen whales, ingestion of plastics has been described in a Bryde's whale (B. edeni) from Australia and in a minke whale from France, but in both cases, no associated consequences were reported and then this represents the first case of death due to litter ingestion in a baleen whale.

Poster code : HUMA-9

Historical and recent occurrence of seals in mainland Portugal

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The Portuguese territory includes mainland Portugal and the archipelagos of Madeira and the Azores. The only population of seals occurring in Portugal is found in the Desertas islands (Madeira), where a colony of Mediterranean monk seals Monachus monachus persists until today. For mainland Portugal, seal's occurrence refers only to occasional sightings or stranded individuals. . The main goal of this study is to document species historical and recent occurrence and characterize spatial, seasonal and annual distribution of seals in Portugal mainland. Information was collected until 2013 through retrospective research in historical archives from Portuguese institutes and from the national strandings by the Portuguese Institute for Nature Conservation and Forests. This study reviews seal's strandings and sightings for mainland Portugal from the 16th to the 21st century. A total of 60 records were recorded and five species (Erignathus barbatus, Halichoerus grypus, Cystophora cristata, Phoca vitulina and Pusa hispida) were documented. The earliest record found was from the second half of the 16th century and refers to an individual of undetermined specie. Assess to different types of data, from historical sources to recent databases, allows for a long term compilation of information and temporal changes. Although some of the identified species are known to occur in polar regions, and records for mainland Portugal are sparse, these occurrences may reflect a general (or anecdotal) distribution of seals possibly reflecting vagrant individuals beyond their know distribution ranges. The information presented here is of particular importance given global phenomena such as climate change. Changes in the distribution range of seals species may be able to be detected if a continuous collection and analysis of data is maintained, also contributing to a better knowledge and conservation of their populations.

Poster code : ACOU-12

CT compared anatomy of ear and MRI analysis of cerebral earing pathways in the Harbour Porpoise.

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Introduction
Cetaceans are mammals that fully adapted to the aquatic life. This study aim to bring a compared analysis based on CT an MRI of inner and middle ear, and cerebral earing pathways, in toothed whales studying Phocoena phocoena versus normal anatomy of the human ear.
Methods
A dead specimen of Harbour porpoise (Phocoena phocoena , Odontoceti) were found beached besides Finistère's coast (France), thanks to "National Stranding Network", its head was brought frozen to the forensic imaging unit. A CT scan (Siemens 64-MSCT) of the whole head was performed, using ultra thin slices (0,4mm) on middle and inner ear. And an MRI was done using a 3D T2 weighted TSE sequence (Phillips ACHIEVA TX 3T)
Results
Out of the inner cavity of skull, two massive bulbous bone contains tympano-periotic complex, siding temporal and mandibular bones. There is no pneumatized structure. The external ear is a less functional channel. Sound is brought to the middle ear by mandibular structures, conduced by fatty channels to a plate communicating with the middle ear. In the middle ear, tympanic bulla contains the 3 ossicles. The inner ear is contained in peritotic bone, its voluminous cochlea is composed by a classic spiraled bone labyrinth. Semicircular channels and vestibular nervous pathways are atrophic. Acoustic nerves and deep acousticomotor loops are hypertrophic and associated neocortex is huge.
Conclusion
In Phocoena phocoena, compared anatomic study merging CT and MRI sequences lead to appreciate the morphologic modifications wich are related to the marine environnement adaptative pressure, and to the echolocation interaction mode. The knowledge of the cetacean ear CT anatomy remains crucial for the study of the causes of death during strandings.

Poster code : ANA-PATH-12

Stranding of pilot whales (*Globicephala macrorhyncus*) to Dakar coast in 2008: Results of investigations and perspectives.

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Cetaceans are gregarious and migratory animals. They make numerous trips during which they face diverse and varied pressures and threats like strandings with adverse effects on biodiversity and environment. Cetacean stranding are often seen on the coasts of Europe and America, however they are very rare on the Senegalese coast. Indeed, in Senegal, the last mass stranding of Delphinis delphis was observed in 1977. But aware that individual cases of stranding are also observed on the Senegalese coast. Whether individual or mass stranding, the causes of such incident are rarely understood in Senegal. The mass stranding of short-finned pilot whales (Globicephala macrorhyncu) on the beaches of Yoff at Dakar, in May 2008, was an event of scientific, media and societal importance. That is why investigations were conducted by multidisciplinary teams (veterinarians, biologists, environmentalists, journalists, and police) to understand this event. Thus, the results obtained allowed the identification of a hundred stranded animals, the catch and release of fifties live animals (19 of which were subsequently died after), measurements and autopsy of 2 cadavers, and analyzes of various samples (organs, urine, blood). Minor injuries and traumatic bleeding (external and internal), parasites (Heterakis spp) and low levels of mercury (muscles, kidneys) and cadmium (kidneys) were noted while lead was not reported in theses organs. The involvement of local communities was an opportunity to appreciate the local knowledge of these populations with respect to the management of stranding. The magnitude of the event and the lack of organization and local expertise have been limiting factors for the understanding of the causes of the Globicephala macrorhyncus stranding. This is why lessons were learned and perspectives were plotted for better management of stranding in Senegal. Keywords: Stranding-Pilot whales (Globicephala macrorhyncus)-Dakar-Senegal.

Poster code : BEHAV-10

Spatial analysis of the behaviour of bottlenose dolphins (*Tursiops truncatus*) in Cardigan Bay, West Wales

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Cardigan Bay holds the largest coastal population of bottlenose dolphins in the UK, providing a unique opportunity to study their movements and distribution, as groups of dolphins tend to follow predictable spatial patterns. This study uses data collected between 2007 and 2013 for a comparative spatial analysis of the behaviour of the dolphins in Cardigan Bay through the use of GIS. Cardigan Bay is a large shallow bay, with depths not exceeding 60 m. Line-transect and *ad-libitum* boat based surveys were conducted on a regular basis with direct visual observation of the animals over an area of 5,000 km2 corresponding to 83 hours of recorded behaviour. Behavioural data were collected at intervals of either three or six minutes, recording four main behaviours: traveling, feeding, resting and socializing. The study area was divided into four sub-areas of interest; Cardigan Bay (958 km2) and Pen Llyn a'r Sarnau (1,460 km2) Special Areas of Conservation (SAC), an inshore sector (3,600 m distance from the coast, 625 km2) and offshore sector (2,885 km2). Traveling (49%) was the most predominant behaviour in the Bay, followed by feeding (25%), socializing (8%) and finally resting (1%). Feeding activities were seen significantly more in the inshore compared with the offshore sector (t-test = 5.917, p = 0.000). Travelling behaviour was observed significantly more in the Pen Llyn a'r Sarnau SAC (ANOVA F = 5.498, p = 0.004), while feeding occurred significantly more within Cardigan Bay SAC (F=13.710, p=0.000). Resting was recorded significantly more in areas outside of the SACs (F = 14.744, p = 0.000) than within the two SACs. The results of this study highlight the importance of inshore waters as a feeding area for the dolphins, with offshore areas mainly used for traveling and resting.

Poster code : ABU-13

Recovering? seal populations

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Worldwide, many seal populations have increased dramatically in recent decades. The increases may be related to a range of local influences, however, the global distribution of such increases suggests non-local factors are involved. One seal that has exhibited such an increase is the Australian fur seal, Arctocephalus pusillus doriferus. This Southern Hemisphere otariid pups at approximately 20 sites in south-eastern Australia and has one of the smallest ranges of any fur seal.
Australian fur seals, like other Southern Hemisphere otariids, were harvested to near extinction 200 years ago. Anecdotal data suggest the population remained consistently low until the mid-1900s, then might have increased slightly until 1980. Thereafter, population growth has been exponential at a rate of approximately 6% per year. Other seal species, including the Cape fur seal, Antarctic fur seal, New Zealand fur seal and, in the Northern Hemisphere, the grey seal and harbour seal, have experienced similar recent growth patterns.
In January 2014, the third estimate of total pup production for the Australian fur seal will be conducted. Results of this will be presented and, based on the monitoring pup production up to the 2013-14 Austral summer, possible mechanisms for the population change will be discussed.
Based on experience with the Australian fur seal, and comparisons with other pinnipeds that have shown recent dramatic increases, the means for the co-ordinated global increases will be discussed.

Poster code : CONS-8

Seasonal movement of white-beaked dolphin in the central and southern North Sea

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The white-beaked dolphin *Lagenorhynchus albirostris* is a highly mobile species. Therefore, the designation of any protection areas or impact mitigation schemes to conserve this species requires evidence based identification of important areas and habitat, particularly calving areas and important feeding grounds. This study aimed to locate key areas for this species off the coast of North East England, and investigate apparent seasonal movements to and from these key areas. Information was gathered off the coast of Northumberland, between 2009-2013, from boat surveys, using effort-based line-transect methods, and incidental sightings. The results of this study provided evidence of potential calving areas for the species, including a near shore area off Newbiggin and Blyth in South East Northumberland. Furthermore, a key result of the study provided evidence of an important foraging area in a bathymetric feature known as the Farne Deeps, a steeply dropping seabed slope where aggregations of up to 100 animals have been observed between late July and mid-September. These offshore aggregations followed a substantial decrease in sightings of *L. albirostris* in near shore waters occurring between July and August. These findings were compared with published data from marine renewable surveys, suggesting that the animals observed off Northumberland, primarily from June-September, may winter on and around the Dogger Bank and other offshore waters in the southern North Sea.It is considered therefore that, should the animals in the central/southern North Sea constitute a discrete geographic population, there may be implications for current population size estimates and the development of offshore renewable energy sources. These developments, which may include pile-driving, could pose a source of impact on this population if construction activities are not carefully managed or timed to avoid periods of peak occurrence.

Poster code : ANA-PATH-13

Volunteer strandings management – a pilot whale case study

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Since 1995, British Divers Marine Life Rescue (BDMLR) has responded to 251 live stranded cetaceans in the UK. The group has several thousand trained volunteers and is particularly active in Cornwall, southwest England. A second volunteer organisation in the region, Cornwall Wildlife Trust Marine Strandings Network (CWTMSN), is the official recorder of stranded marine animals in Cornwall and the Isles of Scilly. CWTMSN has collated a database of over 4000 records for cetaceans, seals, turtles, sharks, birds and other marine species over 360 miles of coastline and CWTMSN volunteers have retrieved carcasses for necropsy for many years. In 2013, volunteers began to assist pathologists with the necropsy of stranded cetaceans, carried out under the auspices of the UK Cetacean Strandings Investigation Programme in the University of Exeter's Environment and Sustainability Institute (ESI). In April 2013, protocols for BDMLR and CWTMSN were tested when an adult female pilot whale live stranded in Falmouth, Cornwall. BDMLR 'medics' responded within half an hour of being alerted to the stranding and first aid and assessment procedures were implemented. As the animal was in suboptimal body condition, the whale was euthanased by a local veterinary surgeon. Necropsy was complicated by the size of the animal necessitating a shore-based examination and the local authority's requirement for prompt disposal. Preliminary examination and carcase removal were performed with the assistance of local coastguards and waste contractors and tissues were removed to the ESI for further examination and sampling. Histopathology confirmed the presence of a multifocal to diffuse meningoencephalitis, the likely cause of live stranding, and moderate to severe acute rhabdomyolysis, a probable sequel to live stranding. The case illustrates how cooperation between different volunteer groups, scientists and local government can manage a live stranding in terms of animal welfare, necropsy and carcase disposal in a challenging environment.

Poster code : ACOU-13

Comparison of two automatic passive acoustic detectors of harbour porpoise signals – Wireless Detection System (WDS) vs. Porpoise Detector (C-POD).

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Automatic passive acoustic detectors are important research instruments to estimate the presence of harbour porpoises (Phocoena phocoena) for mitigation purposes and for monitoring across large areas. However, due to variability of technical solutions, the performance of different types of these instruments needs to be compared and cross-calibrated to ensure the highest quality results. In 2012 and 2013 in the south-eastern North Sea, we deployed two types of acoustic detectors simultaneously – a Seiche Wireless Detection System (WDS, http://seiche.heroku.com) and C-POD autonomous data-loggers (http://www.chelonia.co.uk). A network of several WDS buoys each with a broad-band hydrophone transmitted underwater sound by wireless connection in real-time, to the computer processing centre on a vessel close by. The software PAMGUARD was used to automatically identify candidate signals of harbour porpoises. CPODs were attached to WDS buoys in a way that the hydrophones of the WDS buoy and the CPOD were only about 20 cm apart. CPOD data were processed offline after retrieval of the buoys and compared with the results from the WDS. More than 200 hours of simultaneous deployment were collected. Results show to what extent both systems were able to detect same harbour porpoise events. Furthermore, the results were time-aligned to compare rates of false positive detections.

Poster code : CONS-9

Spatial distribution of harbour porpoises (*Phocoena phocoena*) in a north Norwegian fjord

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The abundance and distribution of harbour porpoises in coastal and fjord waters of nothern Norway is not known. Due to very high bycatch, estimated to 6900 animals per year in only two fisheries in Norway, knowing porpoise distribution in fishing areas could help local mitigation of bycatch. In the area of Andfjorden, land-based observation station and opportunistic surveys from whale watching boats had a very low sighting rate (less then 5 individuals/summer) In the period between 5th July and 1st September 2013 we conducted dedicated ferry line-transects between Andenes and Gryllefjord (37 km distance, 1 hour 45 minutes) in Vesteralen islands, in an area which is a candidate MPA. Up to four crossings were done daily, with two dedicated observers onboard (one on each side). In a total of 60 crossings with sea state 2 or less we had 25 harbour porpoise sightings, with a total of 35 individuals. We examined the spatial distribution of the species in Andfjorden, identifying two areas of high density, and confirmed the importance of ferry lines as porpoise survey platforms in Norwegian fjords. It is suggested to introduce dedicated observers on other ferry lines in Vesteralen and Lofoten area in 2014.

Poster code : ACOU-14

False-positive detections: The risk of overestimating harbour porpoise occurrence using C-PODs

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C-PODs are frequently used for long-term passive acoustic monitoring of harbour porpoises and are especially valuable during times of adverse weather conditions and darkness. Due to an automated classification process provided by the software, false-positive detections can occur, and are typically caused by boat traffic, adverse weather conditions and toothed whales. If false-positive detections occur regularly, then there is a potential risk of overestimating harbour porpoise presence.
C-POD data from May to September, 2009-2012, from an array of three C-POD stations, deployed (approximately 500m apart) in Broadhaven Bay, Co. Mayo, Ireland, were used to extract detection positive minutes (dpm) of porpoises, using the C-POD software version 2.021 with the quality settings “high” and “moderate”. These data were visually verified to ascertain the occurrence of false-positive detections.
Using a Wilcoxon test, the positive detections extracted from the software were compared with the visually verified data at four different temporal scales. These were, detection positive: minutes per hour (dpm/h) and hours per day (dph/d), and presence/absence per hour (dph) and per day (dpd). A highly significant difference ($p<0.001$) was found in all four temporal scales. More than 48% of the false-positive detections across the three stations were likely to be noise caused by boat traffic.
In this case study, where porpoise occurrence is relatively low and ambient noise is relatively high, even on the coarsest temporal scale visual verification is required.
Our study illustrates the need to assess whether or not data extracted from the C-POD software should be visually verified, particularly in areas that are similar to Broadhaven Bay. If this is not done, then there is a risk that harbour porpoise presence is being overestimated, which could have important implications for the conservation and management of this species.

Poster code : PHOTO-4

Using of camera-traps by automatic registration of belugas (*Delphiapterus leucas*) behavior, White Sea, Onezhsky Bay

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We firstly used wildlife cameras to getting twenty-four-hour monitoring and detailed observation data over a belugas gathering during summer 2013. A wildlife camera was placed on an observation tower with height 11 m. The camera-trap was turned to the belugas gathering on-the-mitre 75˚. The enveloped area was 1000 km2. Pickup of the area was carried with frame frequency 2 per 15 minutes. The first testing of a photorecorder was carried out in spring 2013. The lithium-ion batteries were used for permanent work of the wildlife camera. In spite of that the photorecorder worked only three weeks (April, 20th – May, 10th) then it cut off due to batteries exhaust that probably conditioned by low temperature. Tests allowed to state availability of this technique as well get data of ice mode in areas of regular belugas gathering.
The photorecoder was used in June (2nd – 17th) then in August (3d – 8th). Satisfactory quality of taken photos allows singling out adult animals. Due to low resolution and simple optical devices the imageries of impuberal belugas were fuzzy especially in evenings and nights. So use of the photorecoder is perspective to study of belugas visiting dynamics in the research area. Using of wildlife cameras for belugas enumeration is incorrect.
The results of automatic photoregistration confirmed relation between animal visits to the Cape Beluzhy and the flood and ebb regime (r=-0,33). It is shown that number of nubilous belugas in condition of low temperature in nights less than at daylight hours.
In addition illegal activities of tourist's boats were registered in the area of the main belugas gathering.
The work was supported by the International Fond of Animal Welfare (IFAW).

Poster code : ANA-PATH-14

The growth rate of functional teeth of the Pacific walrus

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The materials from Retkyn Spit, Enmelen village, Kolyuchin Island, Vancarem Cape, Enurmino village and the Chegitun river region in 2005, 2007–2008, 2010–2011 were collected. Functional teeth (except tusks) of the Pacific walrus with milk layer saved (that gave possibility for exact age determination) were investigated. The longitudinal sections from middle of 120 teeth from 70 walruses (1-4 teeth from every individual) were made. The annual increment of dentine from buccal, lingual sides and central parts of teeth were measured using program Photoshop CS3. The annual increment of dentine significantly changed (p<0,001) with age on lingual and buccal sides and in the central parts of teeth. On lingual and buccal sides of teeth annual increment of dentine decreased with every year, but in the central parts first increased to 3 year-old age and decreased later. The growth rate of lower jaw teeth (LJT) was slower than upper jaw teeth (UJT). However the annual increment of dentine significantly differed only on lingual side during the 2nd and 4th (p<0,05) years of life and on buccal side during the 1st (p<0,001), 4th and 6th (p<0,05) years of life. The active growth rate of teeth (UJ and LJ) and closure of apical foramen of teeth ended between 3-10 years but in majority of animals – between 5-8 years (83,6%), on average – at age 6,8. The age, when apical foramen closes varies in different teeth even in one individual. On the whole, growth rate decrease every year by 1,1-1,7 times (on average – by 1,3 times), and it was somewhat different on different sides of tooth and in UJT and LJT. The growth rate of UJT was higher and duration of their growth was longer (up to 10 years than in LJT (9 years); as a result, UJT grow in size larger than LJT.

Poster code : CONS-10

Marine Mammal Research in India - Opportunities and Challenges

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India's marine mammal biodiversity is one among the richest in the Northern Indian Ocean. More than 26 species of cetaceans and a sirenian is distributed in 2.03mkm2 of Indian EEZ. Some species like The Ganges River dolphin, Irrawaddy dolphin and dugong have limited distributional range. Indian waters serve as calving/nursing ground for at least 10 species of cetaceans. Despite India's 8118km coast line, its high cetacean diversity, and its membership of many international conservation efforts such as IUCN, CITES, CBD, CMS and IWC, it has failed to develop a professional approach. Much of the information on cetaceans is either from fishery interaction or from stranding. Close to 1 million active fishermen compete with cetaceans for valuable fishery resources that is accounting for 5.4% of India's agricultural GDP. A fall in trawl catches during last decade prompted the administration to develop ecosystem-based fisheries management which requires information on the top predators. As a result cetacean research gained impetus. However there is a wide gap between available data and effective conservation and management. More than funds or expertise for quality research, it is the lack of vision that hampers the progress of marine mammal science in India. India's present approach of taking terrestrial expertise to manage marine resources will gravely misplace its interest to protect few species such as Ganges River dolphin and dugong. India's marine mammal research is critically examined in the light of cultural, bureaucratic and scientific perspectives so as to help international community to have meaningful collaboration.

Poster code : CONS-11

Bottlenose dolphin conservation in French Mediterranean marine protected areas

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The Mediterranean bottlenose dolphin's sub-population is listed by IUCN as "vulnerable". As a coastal species, it is particularly threatened by the intensification of human activities. It is one of the two cetacean species listed on Annex II of the European Habitats Directive for which Special Conservation Areas have to be implemented. In the Mediterranean Sea, many Marine Protected Areas exist along the coast, but only few of them include conservation measures for this species. In 2013, the GIS3M launched GDEGeM (Bottlenose Dolphin Study and Management in the Mediterranean Sea), a collaborative and multi-disciplinary three years project. The objective of this project is to improve the conservation of the north-western Mediterranean sub-population of bottlenose dolphin, through three specific and complementary objectives: Improve the knowledge on the population; provide technical support to MPA's and strengthen the MPA's network to provide a global regional management tool. In order to initiate these 2 last objectives, a questionnaire has been sent to all French Mediterranean MPAs. This questionnaire contains thirty questions about the situation, consideration and conservation of the bottlenose dolphin in their MPA and in the Mediterranean. 20 MPA managers have completed the questionnaire. 100% declare that bottlenose dolphins have been observed in their MPA, only four declare having specific measures implemented for the species, 95% think they could improve the management of the species in their MPA and could contribute, to the conservation of the species at the north-western Mediterranean scale. The analysis of the answers show that the conservation of the species in the Mediterranean MPAs could be largely improved, it helps identifying the needs of the managers and will help to start a concerted reflection and work to improve the conservation of the species in the MPAs and at the population scale through the reinforcement of the MPAs network.

Poster code : ANA-PATH-15

Toxoplasma gondii and Trichinella spp. infections in marine mammals

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Marine mammals are major sentinel species for the contamination of marine environment by terrestrial pathogens. Parasites such as Toxoplasma gondii and Trichinella spp. were found worldwide in several species of marine mammals. Since marine mammal meat consumption is frequent in some parts of the world, T. gondii and Trichinella spp. zoonotic infections are a serious concern for human health. Extensive seroprevalence investigations have been made in USA, Japan, UK, Spain or Italy, showing a high presence of T.gondii infections in marine animals, yet little is known about it in France and Romania. The objective of the present study was to investigate the prevalence of T. gondii and Trichinella spp. in stranded marine mammals of the Atlantic coast of France and the Black Sea coast of Romania. Forty-nine samples, originating from seven different species (grey seal, common seal, common dolphin, common porpoise, bottlenose dolphin, striped dolphin and sperm whale) were collected from both countries. Toxoplasma gondii seroprevalence was detected by MAT, while the presence of T. gondii DNA was assessed by quantitative PCR. An artificial digestion method was used on eleven samples to detect the presence of Trichinella spp. parasites. The overall seroprevalence of T. gondii infection was 38% (with a 1:24 cut-off), with higher rates in common and bottlenose dolphins, species that are living close to the shores. Concerning the quantitative PCR detection of T.gondii, 32% of samples were found positive, most of them with a very small quantity of DNA only. A higher prevalence of T. gondii infection was noticed in Romania, partially explained by the close-in situation of the Black Sea. No Trichinella spp. parasites were found by artificial digestion method. This study indicates the exposure of cetaceans and pinnipeds from France and Romania to T. gondii. This is the first identification of T.gondii in a sperm whale.

Poster code : CONS-12

Introducing the first code of conduct for dolphin watching in the Maldives

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Located south of India in the Indian Ocean, the Republic of Maldives consists of a chain of 26 atolls located between latitudes 7°N and 0.5°S. The waters of the Maldives are part of the International Whaling Commission's Indian Ocean Sanctuary and have recorded 23 species of cetacean (Anderson et al. 2012), which are protected under Maldivian law. Six Senses Laamu operates a daily sunset dolphin cruise to observe spinner dolphins, Stenella longirostris, as they exit the Laamu atoll. It was noted in March 2013 that the boat drivers did not understand how to appropriately drive around dolphins and despite dolphin watching excursions being operated daily throughout the Maldives, a code of conduct has never before been implemented. With disturbance being the major conservation concern related to the dolphin watching industry, since the presence of boats has been shown to change the behaviour of the animals, a code of conduct was introduced for all resort boats. The introduced code of conduct stipulates that boats must keep at least 50m away; should not approach the dolphins directly from behind or head on; must maintain a constant speed and direction when around dolphins; and keep their speed below 6 knots when within 150m. The crews are additionally directed not to cut off or chase the dolphins at speed and to ensure that the boat does not separate mothers and calves. Since the issue of disturbance and its potential negative impacts have never been addressed in the Maldives before, a presentation was given to all the boat crews to explain why the code of conduct was being implemented. Giving the crews an understanding of why the code is being put in place has been shown to help ensure cooperation and compliance. This presentation is specifically looking for feedback regarding the implemented code of conduct.

Poster code : ECO-4

Elaboration of a sexing protocol specific to the population of bottlenose dolphins (*Tursiops truncatus*) from the Normano-Breton gulf.

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The Normano-Breton gulf has the biggest European population of bottlenose dolphin (Tusriops truncatus). The size of this population complicates the extraction of individual variables which makes it difficult to develop detailed studies. At this stage where information such as sex and age of individuals become indispensable, this study focuses on the establishment of a reliable and accurate sexing method adapted to the target population. The established protocol provides a link between three complementary steps for sexing the individuals. The validity of these different steps is verified thanks to the results of previous biopsies established on 67 individuals. The first step is the percentage of partial association between females and young individuals. The second is divided in two subparts: 1) mother and newborn associations ; 2) three conditions have to be fulfilled by the individuals to be sexed. The third step is related to the level of the dorsal fin marking and scratches. The analysis of various parameters measuring the quality of sexing classifications validate these three different steps, and this even more when only adult individuals are introduced into the analysis. The quality of the classification performed on the entire protocol is of the highest quality with an accuracy of 0.99. The sexing method developed in this study is a success as it allows sexing of the majority of adult individuals of the population studied, which leads to the development of detailed studies.

Poster code : ABU-14

Wind farm construction areas: Are harbour porpoises attracted after pile driving has stopped?

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Several studies showed that noise immissions from pile driving activities during construction of offshore windfarms lead to a gradual displacement of harbor porpoises at a spatial and temporal scale. Especially in close vicinity to the construction site where noise levels are highest and additional acoustic deterrent devices (ADD, pinger) and acoustic harassment devices (AHD, seal scarers) are used to displace the animals from a potential danger zone before piling starts, almost all harbor porpoises left the area at least for several hours.
Recent acoustic monitoring of construction sites by means of C-PODs up to 30hrs after pile driving has shown rather uncommon high detection rates of harbour porpoises at distances of 1500 m and 750 m to the construction site a few hours after ramming was stopped. This phase with high detection rates lasted between 2 and 20 hours before it returned to normal levels.
Since porpoise abundance during summer is usually high in that area, comparisons of detection rates close to the construction site with detection rates recorded by C-PODs at long-term monitoring stations some kilometers away support the hypothesis, that the animals actively visit the construction site shortly after piling is finished.
Reasons for the high activity of porpoises in the construction area remain unknown so far, but could be discussed concerning fish stirred up by hammer blows, which would represent an easy prey for harbour porpoises.

Poster code : DISTRI-7

First confirmed record of resident Cardigan Bay bottlenose dolphins in Liverpool Bay may provide answer to heightened level of PCBs previously observed in Welsh dolphins

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The bottlenose dolphin (*Tursiops truncatus*) is afforded special protection under the EU Habitats Directive due to its often coastal habit which brings it into regular contact with human activities. Some of the highest levels of contaminants (PCBs & mercury) in British bottlenose dolphins have occurred rather surprisingly in animals stranded in the relatively unpolluted Cardigan Bay, West Wales. The nearest area of industry is Liverpool Bay, at least 200 km away. Until recently, the Cardigan Bay population was considered sedentary, leading to the designation of two Special Areas of Conservation there. Although it remains an important area for bottlenose dolphins, particularly in summer, we now know that some animals are ranging over wider areas than initially thought, with regular sightings of identified individuals in North Wales, around the Isle of Anglesey and the Isle of Man. In the last two years, with extended effort, bottlenose dolphins have been recorded in Liverpool Bay, but dedicated photo-identification has not been possible until June 2013 when SWF researchers managed to photograph 16 bottlenose dolphins. Nine individuals (56%) were positively identified and matched to the existing SWF catalogue. The remaining animals were unmarked and could not be positively identified. There were distinct differences in sighting patterns between identified individuals: three had previously been recorded throughout Cardigan Bay as well as Anglesey and the Isle of Man; two had only been sighted in northern Cardigan Bay and Anglesey; and four had been sighted previously only off Anglesey. One well-marked individual was sighted off Anglesey only once before, despite extensive photo-identification efforts in that area over the last seven years. These results highlight the complexity of the population structure and residency patterns of the Cardigan Bay bottlenose dolphins and provide a possible answer to the source of contaminants found previously in some individuals.

Poster code : ANA-PATH-16

Differential mobilization of fatty acids from blubber to blood during the post-weaning fast of northern elephant seals (*Mirounga angustirostris*)

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The northern elephant seal (*Mirounga angustirostris*) is characterized by extended terrestrial fasting periods corresponding to breeding, lactation, moulting and post-weaning. During the post-weaning fast, pups mobilize primarily lipids from their large adipose tissue stores, to prevent protein catabolism and extend the developmental fast. In order to study the fatty acids (FAs) composition of different compartments throughout this period, serum samples and biopsies extending the full depth of the blubber layer were longitudinally obtained from 22 pups captured at 1-, 4-, 7- and 10-week post-weaning. Inner and outer blubber layers were analysed separately. Medium-chain monounsaturated FAs (< 20C) (MC-MUFA) were dominant in the inner and outer blubber as well as in the serum over the studied period. Saturated FAs (SFA) were found in the next highest proportion, followed by ω-3 polyunsaturated FAs (PUFA). The major FAs (> 1% by mass) represented more than 95% of the measured FAs in the 3 targeted compartments, the 2 main FAs being 18:1n-9 and 16:0. SFA and ω-3 PUFA were particularly well mobilized from inner blubber throughout the fast, followed by MC-MUFA and ω-6 PUFA. On the contrary, long-chain monounsaturated FAs (≥ 20C) tended to be conserved within the blubber. FAs with a high fractional mobilization are 20:5n-3, 16:0 and 16:1n-7. Their proportions decreased within inner blubber between early and late fast. On the contrary, the proportion of 20:1n-9 rose in inner blubber between early and late fast, as a result of its low mobilization rate from this compartment. The kinetics of FA mobilization were similar to that observed in other phocids as well as terrestrial mammals.

Poster code : HUMA-10

Factors Affecting the Occurrence and Demographics of White-beaked Dolphins (*Lagenorhynchus albirostris*) in Faxaflói and Skjálfandi Bays, Iceland

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The white beaked dolphin (*Lagenorhynchus albirostris*) is a cold species endemic to the North Atlantic, present in Iceland the whole year; however, little is known about occurrence and demographics.
Data were collected between 2008–2013 and 2003–2013 during whale-watching operations in Faxaflói Bay (FB) and Skjálfandi Bay (SB), Iceland, respectively.
Group size was classified as 1, 2, 3, 4, 5-10, 11-20, 20-30, >30 and group composition was also assigned to one of the following age classes: adults, juveniles and calves. Group sizes were standardised to a size per unit effort (SPUE) and modelled using a Generalized Additive Model (GAM), and modelled with respect to selected spatiotemporal variables. The presence of non-adults in a group was also examined using binomial linear models using the same explanatory variables and SPUE.
11.16% (n=75) and 26.88% (n=168) of all dolphin sightings in Faxaflói and Skjálfandi Bays respectively, included immature animals, with 5.35% (FB) and 5.92% (SB) including juveniles. 5.8% (FB) and 20.96% (SB) of them included calves/newborn.
L. albirostris was more frequently observed in groups of 5 to 10 animals, in both bays (FB: n=270, 40.18%; SB: n=302, 38.43%) mainly during the summer months.
Each GAM explained 49% (Faxaflói) and 25% (Skjálfandi) of the variance. For Faxaflói, larger group sizes tended to be found earlier in the year, peaking after midday and found in the North and East part of the bay. In Skjálfandi however, group sizes did not change significantly throughout the year but larger group sizes were found later in the day. Spatially peak sizes occurred in the East and at depths ~200m. The probability of non-adults in a group was found to increase with larger SPUE for both bays.
Further studies are needed to investigate further the effects of abiotic factors on the demographics of this population in Icelandic waters.

Poster code : DISTRI-8

Prevalence of external injuries in small cetaceans in Aruban waters, Southern Caribbean

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Aruba, located close to the coasts of Colombia and Venezuela, is one of the most densely populated islands in the Caribbean and supports a wide range of marine-related socio-economic activities. However, little is known about the impacts of human activities on the marine environment. Injuries in marine mammals can be used to examine interactions with human activities and identify potential threats to the survival of populations. The prevalence of external injuries and tooth rake marks were examined in Atlantic spotted dolphin (Stenella frontalis) (n = 179), bottlenose dolphin (Tursiops truncatus) (n = 76) and false killer whale (Pseudorca crassidens) (n = 71) in Aruban waters using photo identification techniques. Eleven injury categories were defined and linked to either human-related activities or natural causes. All injury categories were observed. In total, 18.7% of all individuals had at least one injury. Almost half (41.7%) of the injuries could be attributed to human interactions, of which fishing gear was the most common cause (53.3%) followed by propeller hits (13.3%). Major disfigurements were observed in all three species and could be attributed to interactions with fishing gear. The results of this study indicate that fishing gear and propeller hits may pose threats to small and medium-sized cetaceans in Aruban waters. Thus, long-term monitoring of population trends is warranted. Shark-inflicted bite wounds were observed in Atlantic spotted dolphin and bottlenose dolphin. Bite wounds of cookie cutter sharks (Isistius sp.) were recorded in all three species, and include the first documented record of a cookie cutter shark bite in Atlantic spotted dolphin. This is one of the few studies which investigates the prevalence of injuries in cetaceans in the Caribbean. Further study is necessary to determine to which extent the injuries observed in Aruba affect the health and survival of local populations.

Poster code : ECO-TRACE-8

Does prey availability influence harbour porpoises (*Phocoena phocoena*) diet, abundance and distribution?

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Throughout the last years, harbour porpoises (*Phocoena phocoena*) population has witnessed a southward shift in the North Sea. This shift has led to an increase in number of stranding porpoises in the Southern North Sea and English Channel. We studied the feeding ecology of harbour porpoises and their potential preys through three complementary methods. The fatty acid (FA) composition of the inner blubber and stable isotopic signatures (δ13C and δ15N) of the muscle were determined in 59 harbour porpoises stranded along the Southern North Sea between 2010 and 2013. In addition, samples of 14 potential prey species collected in winter and late spring were analyzed. Results were compared with the FA and isotopic signatures of 34 porpoises stranded in the Bay of Biscay between 2009 and 2012. Finally when not empty, stomach contents of porpoises stranded in both regions were analyzed to provide information on their recent diet. The results of the study were analyzed and discussed in relation with the evolution of the spatial and temporal distribution and abundance of prey species. The hypothesis of changes in porpoises abundance and distribution depending on prey changes availability was evaluated.

Poster code : ABU-15

Isle of Man: Critical habitat for Risso's dolphins

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Since Manx Whale and Dolphin Watch began surveying in 2007 there have been 62 encounters with Risso's dolphins (Grampus griseus), with positive identifications made in 57 encounters. Photographs for photo-identification have been taken by MWDW volunteers from boats chartered for effort-based cetacean surveys, or from other vessels such as tourist charters. Photographs are added to an identification catalogue depending on whether it is 'well-marked' and can be recognized from both sides of the animal, or whether it is recognizable from just the 'right' or 'left' side. To date the photo-ID catalogue consists of 45 well-marked individuals, 35 left, and 46 right. These numbers give a minimum catalogue size of 91 unique individuals. Of these 91 well-marked and right individuals, 30 (33%) have been re-sighted, of which 12 (13.2%) have been sighted five or more times. Three individuals have been sighted more than 15 times since 2007, and 18 (19.8%) have been seen in more than one year. Individuals are not only being seen across years, but also across months within years. Of the 57 encounters with positive identifications 23 (40.3%) contained at least one calf, and on a number of occasions calves with foetal folds were observed. Critical habitat is that which is necessary for the survival or recovery of a species, or areas of consistent and prolonged seasonal occupancy. Both aspects of critical habitat appear relevant in the case of Manx waters with the presence of calves (possible births) and long term site fidelity seen in some individuals. For the future, collaborative work is needed to collate sightings data from around the UK to determine distribution and relative abundance. This may help to determine a population estimate and other important information such as habitat use, movement patterns, and possible social interactions and population dynamics of this poorly known species.

Poster code : DISTRI-9

Modeling bottlenose dolphin habitat by means of static environmental variables

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Distribution modeling is a relatively new tool to study cetaceans distribution and it is used to understand its relationships with the habitat, which in turn, can be used for several purposes. While habitat preferences of dolphins may be primarily influenced by the distribution of their prey, several studies have suggested the possibility of defining cetaceans habitat selection in terms of physiographic and hydrographic features. The aim of this study is the identification of a relationship between the environmental variables and the distribution of the bottlenose dolphin (*Tursiops truncatus*) in the east Ligurian coast (North-West Mediterranean Sea). We identified four predictive static variables: depth, distance from coast, distance from 100m bathymetry and slope. Data were collected on boat-based survey conducted from 2006 to 2012 and 194 sightings were considered. We applied GLM and GAM to describe and to predict the bottlenose dolphin presence. Predicted distribution generated by the two spatial modeling techniques is different in terms of smoothing, but evidences similar general patterns, with overall preference for depth and distance from coast, maybe in relation with prey availability. Lastly we tested the "random forest" technique; the output is a ranking of the most influential variables that describes the distribution of the animal. Also in this case depth and distance from coast turn out to be the most influential variables in the distribution of dolphins

Poster code : ECO-TRACE-15

First assessment of PAH contamination in Mediterranean monk seal (*Monachus monachus*) in Greece.

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The Mediterranean Sea, both for its geo-morphological characteristics and the very high human activity around its coasts and in its water, can be considered as a "sink" for many environmental contaminants, such as Polycyclic Aromatic Hydrocarbons (PAHs). PAHs are a large class of molecules with condensed benzene rings and the most toxic family of hydrocarbons. They are released in the environment by natural (pyrolysis, diagenesis, biosynthesis, natural seepage) and also human activities (industrial processes, combustion of wood and fossil fuels, motor vehicles, incinerators, oil plants and refineries, oil spills). Particular concerns are related to their genotoxicity; a correlation is thought to exist between high levels of certain PAHs in the environment and an increased incidence of carcinogenesis and mutagenesis in exposed organisms, in particular due to PAHs with four or more benzene rings. The aim of the present study was to assess the impact of PAHs on the largest population worldwide of the critically endangered Mediterranean monk seal (*Monachus monachus*), in Greece. Blubber collected during necropsies (1994 – 2013) from 56 seals of both genders and all age classes was analyzed. In all animals we qualified and quantified 14 PAHs. Total PAHs are expressed as the sum of 14 PAHs (naphtalene, acenaphtene, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenzo(ah)anthracene, benzo(ghi)perylene), while carcinogenic PAHs were quantified as the sum of benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene and dibenzo(a,h)anthracene. Only few papers are published about the ecotoxicological status of Mediterranean monk seals but this is the first study regarding PAH contamination.Fakka

Poster code : PHOTO-5

Evaluation of the influence of whale watching on pilot whales and bottlenose dolphin in the Strait of Gibraltar

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Up to seven cetacean species can coexist in the strait of Gibraltar. Long-finned pilot whale (*Globicephala melas*) and bottlenose dolphin (*Tursiops truncatus*) are the most frequently sighted species and the main target for whale watching operators since 1998. In 2007 a law for the protection of cetaceans was approved (RD 1727/2007) to establish limited areas for the operations of whale watching vessels in all Spanish waters.

We investigated the response and the changes in activity of cetaceans in presence of whale watching vessels between 2003 and 2011. In 2012 we identified pilot whale social groups by photo-identification, and we investigated if some groups were approached more often by whale watching vessels than others. In addition, we evaluated the degree of satisfaction of customers with the duration of each sighting of pilot whale. The most frequent initial and general activity in both species was travelling (68.80% pilot whale and 60.56% bottlenose dolphin), followed by resting and milling. We developed a Wilcoxon test to compare data between initial activity (observed activity before contact with animals) and general activity (major activity observed during the sighting). The sightings with a duration of more than 10 minutes provoked a change in behavior of cetaceans (P-Value<0.05). We have 14 social groups counted in the strait of Gibraltar, of which only 7 have interacted with whale watching boats, two of them (groups 10 and 9) in a 70% of times. We recommend monitoring the fulfillment and efficiency of the Spanish law (RD 1727/2007). Besides, we recommend that the sightings should not last more than 10 minutes to avoid behavioral changes in animals and reduce the influence of whale watching vessels on the natural activity of cetaceans, considering that the interaction is produced with 2 social groups the most of times.

Poster code : ABU-16

Potential species bias in marine mammal monitoring programmes and implications for long-term monitoring studies

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When designing a long-term monitoring programme for marine mammals, maximising survey effort is generally considered a sound approach. However, the detectability of species is likely to be related to the spatial distribution of survey effort. Marine mammal sightings data were collected from two cliff sites (S1 & S2), 8km apart, on opposite sides of Broadhaven Bay (cSAC), Co. Mayo, Ireland, between 2009 and 2012. When environmental conditions were marginal, site S1 was favoured over S2 as it was a logistically simpler site to access and allowed for maximal survey effort. 1,359 (S1 = 748, S2 = 611) scans >30 minutes (mean 70 minutes) were carried out over 260 days (S1 = 238, S2 = 183). Generalized Additive Models (GAMs) were used to investigate the influence of site on the detection of the six most commonly recorded species in the bay; common and bottlenose dolphins, minke whales, harbour porpoises and grey and harbour seals. Re-sightings and duplicate sightings were excluded from the analyses. Season, year, sea state, swell and visibility were included in the models. Despite the influence of the other covariates, site was significant for four species. A higher number of common dolphins ($p = 0.0014$), grey ($p = 0.0034$) and harbour seals ($p = 0.0145$), were seen from S1, while a higher number of bottlenose dolphins ($p = 0.0014$), were seen from S2. The results suggest that favouring S1 under marginal environmental conditions is likely to over-represent common dolphins, grey seals and harbour seals, and under-represent bottlenose dolphin occurrence within the bay. Such biases, even in a relatively small survey area such as Broadhaven Bay, highlight the importance of experimental design and regular review of monitoring protocols to identify and eliminate any such biases throughout the duration of long-term ecological studies.

Poster code : CONS-13

A multidisciplinary approach to study humpback whales (*Megaptera novaeangliae*) around the coasts of Madagascar (breeding stock C3): early information from genetic characterization.

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Humpback whales (*Megaptera novaeangliae*) feed in summer in high latitudes and migrate to tropical or subtropical waters to breed and give birth in the winter. In the southern hemisphere, the International Whaling Commission recognized 7 breeding stocks, often considered as populations, some of which are further subdivided into substocks. The breeding stock C3 regards animals wintering around the coasts of Madagascar, and clearly need to be studied for a better understanding of migration routes and behaviors, and to detect potential inter-annual variations, in particular those that could be induced by anthropogenic activities. Here we describe a genetic study conducted as a part of a multidisciplinary project aiming to study this C3 stock. Biopsies have been taken off the northeast coast of Madagascar from July to September 2012, and the DNA of 67 samples was extracted and analyzed. Sex of individuals was determined, as well as polymorphisms at the mitochondrial DNA control region and at 5 microsatellite-containing nuclear loci. The sex ratio widely towards males is consistent with that observed in other breeding sites and supports the assumption that not all females migrate each year to the breeding grounds. Genetic diversity is very high in our sampling, and two differentiated haplogroups appear according to mitochondrial DNA polymorphisms, whereas no genetic structure can be detected on the basis of microsatellite variation. These results were also analyzed according to the different social groups of the sampled individuals. No genetic proximity between males within competitive groups was observed, although our sampling is clearly too much limited to draw a general conclusion. We plan to conduct the whole project, and especially its genetic part, during the next years (possibly the next decade), in order to be able to analyze possible inter-annual variations between the groups of humpback whales travelling off Madagascar.

Poster code : ACOU-15

How close do they swim? Patterns of coastal occurrence of harbour porpoise (*Phocoena phocoena*) in the German Wadden Sea.

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Porpoise detectors, C-PODs (Cetacean-POD, Chelonia Ltd, UK) were deployed at five positions in the German Wadden Sea of Schleswig-Holstein and Lower Saxony beginning in 2011 to start a continuous monitoring of porpoises. Major aims were at first to describe emerging seasonal, diurnal, tidal and geographic patterns. All devices were calibrated at the German Oceanographic Museum, Stralsund and temperature sensors were calibrated at the ITAW individually for each C-POD. At each station, 6 – 23 Months of data were recorded and analysed. Results show maximum detection rates of up to 80 % dp10min/d (detection positive 10 minute intervals per day). Median detection rates range from 0.7 % to 14.6 % dp10min/d between stations. Highest detection rates occur in March/ April 2012 and April/May 2013 at open water positions. Position Lister Tief, which is more sheltered between the island Sylt and the mainland, show quite different seasonal patterns with a minimum at summer time at much lower detection rates compared to the other stations. Previous studies in the Wadden Sea area showed diurnal patterns in short investigation periods. In our data we find seasonally limited diurnal pattern at some positions, but more data is needed in order to verify these patterns within successive years. Modelling using generalised additive models (GAMs) revealed correlations of detection rates with tide, tide direction, water temperature and recorded noise. Most important variables in the models were month of the year and temperature. Distinct differences between positions were found in seasonal patterns in terms of highest occurrence rates. The open water positions showed strong similarities of increased detection rates in spring gradually decreasing towards summer and autumn. The results indicate highest presence of harbour porpoises in the Wadden Sea in spring before the birth period in May/April with preference for open areas instead of more sheltered areas.

Poster code : ECO-5

The complete mtDNA sequence of *Ziphius cavirostris* (G. Cuvier, 1823): a phylogenetic and comparative analysis

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The animal mitochondrial genome (mtDNA) is a circular double-helix molecule of about 16 kb in length that contains 37 genes (Boore, 1999 Nucleic Acids Res. 27:1767-80). During the last years phylogenetic mtDNA-based analyses have supported studies conducted using nuclear DNA (Cabria et al., 2006 Gene. 375:1-13). The Cuvier's beaked whale Ziphius cavirostris is an odontocete marine mammal belonging to the family Ziphiidae. Like all beaked whales, this species prefers deep waters and tissue samples available for detailed phylogenetic studies are relatively rare (Zhou et al., 2011 Mol Phylogenet Evol. 61:255-64).
The Mediterranean Marine Mammal Tissue Bank (MMMTB), established in 2002, is currently located in the Department of Comparative Biomedicine and Food Science of the University of Padova, Italy (http://www.mammiferimarini.sperivet.unipd.it/eng). The MMMTB collects whole organs and tissue samples from animals that stranded along the coasts of Italy and were sent to the bank facilities for postmortem diagnosis. We sequenced the complete mtDNA of Ziphius cavirostris from frozen samples of muscles available in the MMMTB using the Sanger method of sequencing (San Mauro et al., 2004 Mol Phylogenet Evol. 33:413-27). The new sequenced mtDNA was combined with other Cetartiodactyla mtDNAs. The obtained multiple alignments allowed to define the phylogenetic placement of Ziphius among Ziphiidae and to investigate the evolution of mtDNA in Cetacea.
A better understanding of phylogenetic relationship among species of marine (and terrestrial) mammals will increase our knowledge of their evolutive patterns and our awareness of their sentinel role in the changing aquatic environment.

Poster code : CONS-14

Cetaceans hotspots and coldspots into the Pelagos Sanctuary.

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The Pelagos Sanctuary is a large SPAMI of about 87500 km2 where richness is heterogeneous. The study consists to analyse data collected aboard ferries traveling during summer. Ferries are efficient platforms of opportunity that collect data regularly on space and time with limited effort distribution bias. First, the study aims to evaluate the presence of species hotspots/coldspots. To do so, we calculated the effort distribution on two grids where the effort value per cell depends on a threshold of coverage. For the 5x5km grid (striped dolphin hotspot study), the effort unit (EU) was 2.5km; for the 10x10km grid (for fin whale) EU is 4km. Then we ran Monte Carlo extractions to establish hotspost/coldspots for both species. In the case of the fin whale, on the total of the127 sampled cells (with a total of 2160 EU -8640km), we had 118 sightings of fin whale. The extractions indicated on Toulon-Ajaccio, 3 hotspot-cells where whales significantly aggregate (on the northern part of TA, over the deep section) and we did not find any significant coldspot (significant absence of whale); on Nice-Calvi, 6 hotspots (over more than 2500m depth) and one coldspot on Nice side; and on Savona-Bastia, 5 coldspots. The results are consistent with usual fin whale habitat description and give inputs about the significant absence of fin whale in the east of Pelagos Sanctuary. The second part of the study analyzed the cetacean diversity with a 4-year dataset. We analyzed data collected on Nice-Calvi and Savona-Bastia over a grid of 5x5km. We calculated the number of species per cell and the mean number of species over the 4 years (only where at least one species have been observed each year). The higher value (2.75) is in the mid of Nice-Calvi.

Poster code : DISTRI-10

Priliminary results of ferry transect study between Balearic Islands and Barcelona

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Lineal transect surveys from ferries platforms are commonly used for cetacean monitoring. However, the High Sea area between Balearic Islands and Barcelona hasn't been systematically covered. Biodiversitat marina project has carried out a dedicated survey year-round from Palma de Mallorca to Barcelona twice a month since June 2012. Each survey is carried out by 3-4 observers and they cover a 180º angle using binoculars, naked eye and recording data from ship board and a range stick. Coastal area and summer time are hardly ever sampled due to ship restrictions. Species, GPS position, angle and distance of cetaceans, turtles and marine birds are recorded. Preliminary results from June 2012 to June 2013 end up with 126 h of effort, 4576 Km surveyed and 183 cetacean sightings. Nine species have been recorded, with encounter rates of: ERStenella coeruleoalba = 0,016, ERBalaenoptera physalus = 0,007, ERTursiops truncatus = 0,0052, ERZiphius cavirostris = 0,0009, ERDelphinus delphis = 0,0007, ERGlobicephala melas = 0,0004, ERPhyseter macrocephalus = 0,0004, ER=Grampus griseus 0,0002, and ERОrcinus orca = 0,0002. 74% of the sightings belong to stripped dolphins and fin whales. They occur equally along the High sea area transect. Although data is not enough to link the sightings to any variable, Cuvier beaked whales seem to appear in a concrete area (map), coinciding with the prediction model by Cañadas et al. 2011. Future data gathered by the project will shed light in cetacean's distribution and patterns. Values will be modified as new data is analysed and data of a new route from Ciutadella (Menorca) that is starting next month is going to be included.

Poster code : ECO-6

Results of anatomico-pathological autopsy of dead northern fur seal pups on the Tuleny Island (Russia), 2012

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The changes in the population abundance of the northern fur seal (*Callorhinus ursinus*) are of cyclical pattern. At present the population of fur seals on Tuleny Island (Sakhalin, Russia) has reached a peak abundance. An increase in mortality rate and a decrease in population are expected. We were interested in the factors, which regulate a species population in the periods of its peak. In the end of breeding season of 2012 an anatomico-pathological autopsy of 121 new-born pups (56 females and 65 males) fallen due of natural causes was performed. The fallen pups were collected on the sealing ground randomly. The average weight of females was 4.0±0.65 kg, and males was 4.5±0.73 kg. Based on the full anatomico-pathological picture we could make a provisional diagnosis. The causes for the pups' death were catarrhal and acute hemorrhagic gastroenteritis (71%); pneumonia and fluid lungs (8%) and other causes (21%). Gastroenteritis and fluid lungs of pups could be conditioned by alimentary, stress, and weather factors as well as prenatal underdevelopment. However, the leading role in the flow of the illnesses belongs to viruses and microorganisms of opportunistic and pathogenic character. Among others the following causes were revealed: sepsis with minor multiple hemorrhaging in internal organs (7.1%); fatalities associated with obstruction of alveolar tissue by the pebbles on the sealing ground (5.8%), physiological underdevelopment (4.1%), death by violence as a result of intraspecific interactions (1.6%), traumas (1.6%) and starvation (0.8%). The main causes of death of fur seal pups on Tuleny Island in 2012 were gastroenteritis and pneumonia, which probably are connected with the circulation of the infectious agents in the population that regulate the pups' abundance in the first months of their lives.

Poster code : CONS-15

Are humpback whales electing the Mediterranean Sea as new residence?

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Once considered exceptionally rare in the Mediterranean basin, in the last decade the occurrence of humpback whales (*Megaptera novaeangliae*) in this Basin has increased.
Since 2001, 14 sightings, 3 strandings and 2 by-caught individuals have been reported from different locations across the Region. All individuals, ranging between 7 and 12 meters, were estimated to be 2-3 years old juveniles. No re-sightings have been documented to date, suggesting scouting and exploratory behaviors.
Here we report the first re-sightings of a humpback whale in three different locations in the Mediterranean Sea. A whale, approximately 8-9-meters long, was first observed in the Ligurian Sea, NW Mediterranean, in June 2012. The same animal was then re-sighted off Lampedusa Island, Sicily Channel, in March 2013 over 1,000 km away in a straight line from the previous location and again in August 2013 in the Ligurian Sea.
During the last sighting, the animal was associated to a fin whale (Balaenoptera physalus), the only known resident mysticete in the Basin. In all the occasions the whale didn't show any sign of distress and, in the Lampedusa sighting, several episodes of surface feeding were observed.
This specimen apparently managed to discover and exploit the main known feeding grounds for fin whales in the central Mediterranean Sea, where this species regularly preys on very abundant euphausiids species.
These findings suggest that the Mediterranean Sea offer suitable habitats not only for fin whales but also for other mysticetes. The recent recovery of the North Atlantic humpback whale population might increase migrations of individuals in the Mediterranean through the Gibraltar Strait. This range expansion, possibly leading to a (re)colonization of the Mediterranean in the future, could expose the species to severe anthropic pressures (ship strikes, acoustic-chemical pollution) and urges appropriate mitigation measures to be considered and implemented also for this species.

Poster code : ANA-PATH-17

Immunohistochemical distribution of alpha-MSH and NPY in the hypothalamus of the bottlenose dolphin (*Tursiops truncatus*)

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Alpha-melanocyte stimulating hormone (alpha-MSH) is a tridecapeptide secreted in the blood by the *pars intermedia* of the hypophysis in most mammals. Cetaceans are among the few mammals that do not possess an intermediate lobe of the pituitary. Together with a few other species, cetaceans are an exception, lacking an intermediate lobe. Recently, the presence of the hormone was localized immunohistochemically by our group in the anterior lobe of the pituitary of four odontocetes. The role of alpha-MSH in cetaceans is quite uncertain, since the circulating hormone in mammals is related mostly to hair pigmentation, but adult cetaceans are hairless. However, this peptide plays an important role as a neurotransmitter in the central regulation of energy homeostasis, by acting on the hypothalamic centers that regulate appetite and food intake. Specifically, the arcuate nucleus of the ventral hypothalamus is the main source of alpha-MSH, which has anorexigenic effects, but also of NPY, another peptide neurotransmitter with opposite effects on appetite. We examined the hypothalamic regions of three bottlenose dolphins (*Tursiops truncatus*) to assess the distribution of alpha-MSH- and NPY-positive elements. Preliminary results show the presence of immunoreactive cell bodies in the posterior hypothalamus, dorsal thalamic nuclei and in the paraventricular region. Since the hypothalamus is one of the least known cerebral structure in cetaceans, and given that many cetacean species undergo more or less prolonged periods of fasting (e.g. during migration), the characterization of the hypothalamic orexigenic system might shed light on the central control of energetic balance in these marine mammals.

Poster code : CONS-16

Habitat availability for the Mediterranean monk seal (*Monachus monachus*) in Montenegro

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The current world population of the critically endangered Mediterranean monk seal (*Monachus monachus)* is estimated to consist of 500-600 individuals. The species' former distribution extended throughout the Mediterranean, the Black Sea and NW Africa. Nowadays, actively reproducing populations are found mainly in Greece, N.W. Africa/Western Sahara, Turkey and Desertas Islands/Madeira. Recent sightings indicate that the species may still exist throughout its ancient habitat where it is considered extinct or of unknown status. Such areas are characterized inter alia by recent sightings and habitat availability. Most countries adjacent to the Adriatic Sea are among these "low density areas".
The current situation in Montenegro with respect to monk seal presence and habitat availability was unknown. In September 2013, we systematically surveyed a coastline of ca. 35 km between cape Arza and cape Platamuni in Northern Montenegro for the first time. We registered eleven caves with a beach inside. Two caves were located within an area where an MPA is planned to be established. We did not find evidence of seal presence but the caves are suitable for resting and reproduction, particularly considering the species' confirmed presence in this region until at least the early 70's.
Single surveys may not detect seal evidence even in areas well known for their stable seal population such as Alonnissos in Central Greece. Further surveys including Southern Montenegro and the involvement of the coastal residents reporting potential sightings are needed in order to establish the real present situation.
Given the presence of monk seals in the neighbouring countries, especially recent sightings throughout Croatia and an actively reproducing seal population in the Greek Ionian Sea and considering the ability of the species to travel over long distances within a short time, we believe that the area of study may be recolonized if appropriate protection measures are implemented.

Poster code : ACOU-16

Dolphin species change frequency parameters to compensate for increasing background noise

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An increase in ocean noise levels could interfere with acoustic communication of marine mammals. In this study we explored the effects of a noisy environment on the acoustic properties of a dolphin communication signal. A towed array with four elements was used to record background noise and whistles of short-beaked common, spotted and striped dolphins in the Canary archipelago. Four frequency parameters were extracted from each whistle. Sound Pressure Levels of background noise were measured at the central frequencies of seven one-third octave bands, from 5 to 20 kHz. Results suggest that dolphins tend to modify parameters generally related to species-specific features, such as maximum and minimum frequency, in presence of noise levels higher than the environmental background and attributable to anthropogenic sources, while changes in the parameter of end frequency may adequately compensate for increases in fluctuating noise levels from natural sources. Dolphin signals are not only adaptive but they could be actively modified to cope with noisy environments.

Poster code : ACOU-17

Variability in the acoustic niches of 59 cetacean species by canonical correspondence analysis

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We analyze the relationships between acoustic emissions and 29 biological characteristics of 59 cetacean species. We have standarized sound records of each species for comparative purpouses using Audacity software. Biological parameters are related to different aspects of feeding, behaviour, morphology, longevity and taxonomy. We determine that biological characteristics are associated with the acoustic interspecies variability by Canonical Correspondence Analysis (CCA). The results indicate that only four factors of variation between species exists. The first factor represents 44.56% of total variance and separate species with an anciant taxonomic origin such as *Zifius cavirostris* and *Mesoplodon densirostris*. The second factor with 29.49% of variance separates great whales (*Balaenoptera spp*., *Balaena mysticetus* and *Eschrichtius robustus*) from delphinids (*Delphinus spp*., *Grampus griseus*, *Lagenorhyncus obliquidens* and *Feresa attenuata*). The third factor of variation collects 6.12 % of the total variance and differentiate certain species with a high degree of specialized feeding. The fourth factor represents 5.23% of variance and only separates the Franciscan (*Pontoporia blainvillei*) from the rest. With these four factors we can explain in biological terms 85% of the total variance observed in a majority of cetacean species. Our results indicate that the interspecific variation in cetacean sonometry is highly complex but can be associated to only four multivariate factors that are associated to 29 biological characteristics in a variable degree. However only three biological parameters are significant. These are specialized feeding on pelagic fish (R2 = 51.23), feeding in deep waters (R2 = 0.4) and the taxonomic origin of each cetacean species (R2 = 0.36). In conclusion we have feeding and the evolutive origin as the main causes of sonometric variation in cetaceans.

Poster code : DISTRI-11

Migration of baleen whales in Pico Island, Azores

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Understanding the migration of baleen whales from a breeding area for feeding areas implies a large use of energy which can be acquired during the same migration. The waters adjacent to Pico Island, Azores, have been known for a long time as an area crossed by baleen whales during their migration. In order to understand the usage of this area by baleen whales an observation effort of 10031 Km has been performed. Behavioral data has been collected; as well as photo-identification (Blue whale and Fin whale only), group composition and the response of the individuals to the presence of the Espaco Talassa vessel, which made over 178 whale watching trips during the period from April to June, in 2012 and 2013. A total of 157 sightings divided by 5 species, Balaenoptera borealis (Bb) 27, Balaenoptera musculus (Bm) 46, Balaenoptera physalus (Bp) 72, Megaptera novaeangliae (Mn) 9, Balaenoptera acutorostrata (Ba) 1, and the species could not be determined for 2 individuals Balaenoptera sp. (B). It was possible to understand that about 71 % of baleen whales sighted were in feeding behavior and 29 % were traveling. By photo identification it was observed that Blue Whales can stay in the same area for at least one week. It was also observed that the presence of the vessel did not alter the baleen whales behavior, as they were indifferent to the presence of the vessel in 89% of the sightings, and would approach the vessel in 9% of the sightings. Baleen whales only displayed an evasive behavior in 2% of the sightings. The data from this study demonstrates that baleen whales may use specific feeding areas in order to acquire the nutritional requirements necessary for their migration.

Poster code : ECO-TRACE-9

Northern elephant seals: integrators of persistent organic pollutants in the deep ocean

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Northern elephant seals (*Mirounga angustirostris*) travel thousands of kilometers to forage in mesopelagic (200-1000 m) regions of the North Pacific. Lengthy foraging trips interspersed with time on land make elephant seals ideal integrators of difficult-to-study oceanic ecosystems. On land, elephant seals fast, resulting in extreme fluctuations in mass. Our study (1) measured the concentrations of persistent organic pollutants (DDTs, PCBs, and PBDEs) in adult seals during body condition extremes, (2) quantified correlations between contaminants to determine similarity of bioaccumulation patterns, and (3) used satellite-tagged females to describe contaminants in relation to foraging ecology. Full-thickness blubber cores and serum samples were collected from seals before and after their long (6-8 month) foraging trip (2011 and 2012). Female samples were paired (N=24), whereas unique males were sampled before (N=16) or after (N=17) the foraging trip. All females were instrumented with satellite- and time-depth recorder tags. DDTs, PCBs and PBDEs were detected in all samples, in decreasing mean concentration. On average, the DDT metabolite, p,p'-DDE, comprised 99% of ∑ DDTs in blubber samples. Mean concentrations of ∑DDTs, ∑PCBs, and ∑PBDEs in blubber upon arrival to land from a foraging trip were twice as high for males (2008, 1176, and 31 ng g-1 lipid, respectively) compared with females (987, 653, and 15 ng g-1 lipid, respectively). Upon arrival to land, ∑DDTs and ∑PBDEs in male and female blubber samples were highly correlated ($p<0.001$; $r=0.92$ and $r=0.95$, respectively), whereas only males had a significant correlation between ∑PCBs and ∑PBDEs ($p<0.001$, $r=0.77$) and between ∑PCBs and ∑DDTs ($p<0.001$, $r=0.91$). Differences in male and female bioaccumulation may be due to behavioral differences in both foraging and reproduction. Our results support elephant seals as an integrator of deep-ocean contaminant exposure. Elephant seals are easily studied and their bioaccumulation patterns may reflect threats to more cryptic marine predators.

Poster code : ACOU-18

Whistle characterization of spinner dolphin (*Stenella longirostris*) of Grande Comore

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Grande Comore is the biggest island of archipelago of Comoros and is located in the northern Mozambique Channel. It is part of the Sanctuary of Cetaceans of the Indian Ocean. Aim of this study is to describe region-specificity in acoustic traits of spinner dolphin whistles. Geographic variation can provide valuable information because they may reflect dispersal capabilities of a species (Mundinger,1982 ; Mc Gregor et al. , 2000). In 2011, 2012 and 2013, we run 135 small-boat surveys within 3 miles from the coast. We made a total of 337 hours of direct observations. We recorded the vocalization with an SS03-30 omnidirectional hydrophone (freq. range 30Hz-30kHz) connected to a custom-built preamplifier (Gain 25 dB, re 1V/μPa. Recordings were analyzed by extracting whistle parameters using the spectrogram view in the program COOLEDIT (Syntrillium Software, Scottsdale, AZ): duration, freq. start, freq end , freq. max , freq. min, freq. range, beginning slope, ending slope, n ° inflection point, n° step, presence/absence of harmonics ,n° peak, n° cavity, number of interruption, presence of multi loop. We compared the results with previous studies from the Atlantic and Pacific Oceans. The whistles of Stenella longirostris from the Indian Ocean significantly differed from those from the Atlantic and Pacific Oceans (Student t-test, $p<0.001$, Bonferroni corrected) for each spectral and temporal parameter, suggesting a potential geographic specificity of these signals.

Poster code : ECO-TRACE-14

The first report on metallothioneins in peripheral blood of bottlenose dolphin (*Tursiops truncatus*) born in aquarium, Argentina

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Metallothioneins are proteins involved in the homeostasis of essential metals and detoxification of those non-essentials and its role as a protective against oxidative stress is also known. They are considered as biomarkers due to constitute responses at biochemical molecular level, being considered as early warning signals. The blood is a noninvasive method to assess environmental stress and health status, plus sensitivity of biomarkers relevant information can be achieved. Tursiops truncatus is a coastal species and basically ichthyophagous, but the specimens analyzed correspond to dolphins born in oceanarium, feeding exclusively with fish and sometimes with gutted fish. The objective was to evaluate metallothioneins in peripheral blood of bottlenose dolphins born in an aquarium. Three adult male dolphins, with good health status, were analyzed, and they were monitored during one year. Metallothioneins determination was performed by UV -Vis Spectrometry. The cell fraction presented the highest concentrations, 3:1 ratio respect to plasma. Younger dolphins (15-16 years) showed similar concentrations and significantly higher than found in the oldest dolphin (29 years). Metallothionein levels have remained constant throughout the year. The information constitutes the first record of metallothionein for the species, and could be used as reference values.

Poster code : REPRO-5

Characterising the long term decline of a grey seal breeding colony.

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As recently as the 1960s, North Rona (NR) in the Outer Hebrides was the largest single grey seal breeding colony in the UK. Although counts were obtained using different methodologies, it is accepted that annual pup production peaked at over 2500 in the 1960s and declined steadily since the 1980s to an estimate of below 400 in 2013. Certain of the basic descriptors of the breeding colony have changed during this time as pup production has declined. 1. The two core areas of the island used by the seals have remained the same, governed as they are by access routes from the sea. Intermediate areas used at the height of the colony's use are now used rarely. 2. The mean pupping date of the colony has varied by a few days around the 8th October. Environmental and individual effects act in opposite directions to stabilise this. 3. Individual-based studies indicate that mothers grow asymptotically larger as they age, but some mothers are substantially larger now than ever before, with some on a par with their conspecifics in the Eastern Atlantic. Maternal condition of those breeding is not an issue. 4. Apparent survival of mothers is low and recruitment of marked pups is also low, even though NR pups are larger at weaning than those for example at the Isle of May. 5. Operational sex ratios ashore have increased from 7:1 (F:M) to 12:1. We consider the suggestion that NR has always been a sub-optimal breeding site for grey seals and that more recent cohorts are using other colonies nearby.

Poster code : BEHAV-11

Identification of ecogeographical (EGV) variables associated with occurrence of harbour porpoise (*Phocoena phocoena*) off the NorthEast coast of Scotland.

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To inform conservation management in cetaceans, it is important to identify preferred habitats. The present study was focused on studying the environmental variables that best explain the occurrence of one of the most common marine mammal that inhabits Scottish waters, the harbour porpoise (*Phocoena phocoena*).
From the regular surveys that took place between 2004 and 2009, using ferries between Aberdeen and Shetland as a platform of opportunity, data on presence-absence of porpoises were related to a set of satellite-derived ecogeographical (EGV) variables based on the ones collected during the survey, and processed under a GIS framework. General Additive Models were used to find out which variables better explain the surveyed presence-absence pattern of P. phocoena. The final models developed for the pooled surveyed and EGV datasets as well as for early summer (April to June) and late summer (July to September) separately, were based on forward selection and the AIC criterion.
As expected, there was a negative relationship between sightings and seastate. When this was taken into account, results indicated a preference for waters located around 20km from the coast and with euphotic depth zone between 30 and 40m. In early summer, latitude was the most important predictor of porpoise presence while sea surface temperature, the bathymetry and the chlorophyll concentration also remained in the final model.

Poster code : REPRO-6

Foraging areas of southern elephant seals of the Falkland Islands: shopping close to home

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Southern elephant seals (*Mirounga leonina*; SES hereafter) are a key component of the biodiversity of the South Atlantic Ocean. Their foraging areas and patterns have been studied in most populations, with the notable exception of the Falkland Islands. We deployed Argos satellite tags (SPOT5, Wildlife Computers) on 23 breeding SES females of Sea Lion Island (SLI hereafter), the main breeding colony of SES in the Falklands, to determine foraging areas during the post-breeding migration. All females were of known age and with well documented breeding history. Although some females carried out long migrations, with loops of thousands of km - heading south to the Antarctic Peninsula or crossing the Drake Passage, moving to the Pacific Ocean and foraging in deep water off the Chilean coastline - most females (65.2%) foraged close to SLI (maximum distance 122-402 km), in rather small areas, characterised by shallow maximum water depth (78.3 % females over areas with median depth < 600 m; only 3 over depth => 4000 m). This unusual foraging pattern shows that good food resources are available close to SLI, and may have a positive effect on the energy budget of breeding females. This can be in turn related to the good status of the population (increase in size and productivity in recent years, high average weaning weight of pups), and to the resilience that the population is showing to changes in global climatic and oceanographic conditions. From a practical point of view, foraging close to the Falklands increases the vulnerability of seals to human disturbance, in particular due to the expected increase of activities related to the oil industry. The matter should be thoroughly investigated, by deploying a greater number of instruments with depth recording capabilities, to better understand the interactions between seals and offshore oil extraction.

Poster code : DISTRI-13

Long term monitoring of dolphin's vocalization in the Gulf of Catania

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The SMO (Submarine Multidisciplinary Observatory) project born to develop new technologies in high depth underwater acoustics for biological, high energy astrophysics and geophysical studies. In synergy with the EMSO (European Multidisciplinary Seafloor and water column Observatory) framework, the project led to the collaboration of INFN and INGV (Istituto Nazionale di Geofisica e Vulcanologia) to promote the installation of cabled deep-sea infrastructures offshore Eastern Sicily. Since the stations were equipped with oceanographic, geological and acoustic sensors (hydrophones), a long term study on pelagic dolphins vocalizations could be carried out. Data were acquired continuously from July to December in 2005, 2006 and 2012 by the two submarine stations of NEMO-OnDE and SN1-EMSO, at a depth of 2100 m, 25 km off the Catania harbor. The hydrophones sampled acoustic data with a rate of 5min per hour and the information was sent directly to the on-shore laboratory. In order to investigate the presence and occurrence of delphinidae species in the area, recordings have been analyzed through both listening and spectrograms inspection. Results show that dolphins were present in the study area for around 50% of the recordings analyzed. A variety of signals belonging to the dolphin's acoustic repertory was detected: clicks, whistles, castanets and buzzes. Furthermore, a clear daily and seasonal pattern in the vocal emissions was revealed. Further studies will allow to better understand the observed variations and to assess correlations with environmental or anthropogenic variables.

Poster code : ACOU-19

What's that you sei? Confirmed sei whale vocalisations recorded off the Azores

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Recordings of sei whale (*Balaenoptera borealis*) calls, accompanied by confirmed sightings and locations of the vocalising individuals, are described for the first time from the Azores Archipelago. Sei whales transit the area during their migration to northern latitudes in spring and early summer. Data were collected from the R/V Song of the Whale during an encounter with two sei whales in April 2012 off Pico Island, Azores. Acoustic recordings were made using a wide-aperture stereo array which included a calibrated hydrophone. Surface behaviour of the whales was recorded using video range tracking (VRT) techniques concurrently with acoustic recordings to derive positional information on the whales at the surface. Post-survey analysis of the acoustic data revealed 53 low frequency downsweep calls with average maximum frequencies of 99.76 ± 13.57 Hz down to 37.37 ± 8.44 Hz over 1.21 ± 0.33 seconds. Call source levels were also measured with a resulting average value of 180 ± 5 dB rms re 1 μPa @ 1 m. Vocalisations were localised and positively attributed to the pair of sei whales encountered using a combination of the VRT data and differences in arrival time of calls at the hydrophones. Calls described here are identical to those attributed to sei whales off New England and similar to those recorded off Hawaii. However they are dissimilar calls recorded in the presence of sei whales off both Antarctica and Nova Scotia, suggesting a geographical variability in sei whale vocalisations. The growing body of acoustic data on sei whale vocalisations may, in the future, contribute to understanding of this species distribution and population identity; key information which is needed to guide future conservation efforts for this little known baleen whale.

Poster code : ECO-TRACE-10

The Mercury and Selenium relationship in franciscana dolphin (*Pontoporia blainvillei*) from two different impacted environments of Argentina.

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Franciscana dolphin is the most endangered cetacean in the Southwest Atlantic. In Argentine waters, there are two geographical groups, one in the Samborombón Bay area (estuarine stock), with recognized high antropogenic impact, and another in the south of it (marine stock). The aim was to assess hepatic levels of mercury (Hg) and selenium (Se) in P. blainvillei between age classes and in the two groups. There was no difference between groups, suggesting a natural input of Hg through diet (mainly fish). Adults presented higher Hg and Se concentrations than juveniles and calves. Fetus had higher levels of both metals than calves, suggesting mother-fetus transference. There was a high correlation between Hg and Se levels, with an average molar ratio Se:Hg = 5:1. It is evident that the demethylation process in the species increases with the development and the growth of individuals, during ontogeny; and the correlation between both metals would indicate that the hepatic accumulation of Hg P. blainvillei is mainly through the Hg-Se granules.

Poster code : HUMA-13

Long-term effects of the offshore wind farm alpha ventus on harbour porpoises

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Offshore wind farms constitute a new and fast growing industry all over the world. This 5-years study (2008-2013) aims at possible long-term effects of the first offshore wind farm (OWF) in German Waters, alpha ventus, on harbour porpoises (*Phocoena phocoena*). The wind farm was built in 2009 about 45 km offshore in the North Sea in water depths of 30 m. 12 turbines were placed on either tripod- or jacket foundations, which all were secured with steel piles driven with hydraulic hammers into the sea floor. Porpoise presence was monitored by acoustic porpoise detectors at 12 stations positioned at different distances to the wind farm area, and by monthly aerial and ship-based surveys over the whole study period of 5 years. It was shown that noise emissions from offshore pile driving caused short-term, large-scale displacement of harbour porpoises. Even though animals came back into the wind farm area within a few hours after pile driving stopped, density and detection rates were lowered in the OWF area and its close surroundings for two more years after construction. Numbers gradually increased until no difference to the Baseline was registered anymore in the third year after construction. The gradual increase might be explainable by a potential positive effect of the wind farm over time, as organisms start to grow on the foundations and increase foraging possibilities, or by a longer endurance of a negative effect due to higher ship traffic and occasional works in 2010. Furthermore, a general increase of harbour porpoise densities during the last few years in the wider area might have played a role.

Poster code : ACOU-20

Oil industry and noise pollution on the humpback whale (*Megaptera novaeangliae*) acoustic environment in the Southwestern Atlantic breeding ground

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Marine noise pollution is constantly increasing around the world and recalled as a concerning threat to the aquatic life. The present work aims to access acoustic overlapping between the humpback whale song and anthropogenic sounds around oil and gas platforms, through spectral description and frequency comparison. Within a systematic whale monitoring in Northeastern Brazil (11° S, 37° W - 14° S, 38° W), bioacoustic data was collected from 2007 to 2009, focusing on humpback occurrence around oil platforms in the study area. Diverse anthropogenic noises were found, in a similar frequency range than the recorded cetacean sounds, which suggests overlapping of acoustic niches. Noise pollution from oil and gas production potentially may affect the species communication, with implications on its distribution and behavior in their breeding area. This paper is the first report of acoustics between oil platforms and cetaceans for the Southwestern Atlantic Ocean, urging efforts to the development and insertion of this research tool, facing the increase of gas and oil exploitation.

Poster code : PHOTO-6

Natural marking gain rate in Risso's dolphin dorsal fins

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Risso's dolphins have distinctive natural marks which allow individuals to be photographically identified. However, no specific studies on Risso's dolphin natural marking has been published so far. This preliminary work aimed to measure the overall marking gain rate - over years - on a typical Risso's dolphin dorsal fin. To do so, we analyzed a random sample of photographs from a photo-ID dataset containing photographic capture events of Risso's dolphin from the Ligurian Sea (Northwest Mediterranean). Therefore we used the photographic software Image J, threshold and freehand techniques to calculate the density of scarred, unscarred and notches pixels within the visible dorsal fin area of different individuals. The bias due to the method used to trace the natural marking was calculated (e.g. the variability in visibility among different pictures of the same dorsal fin). The bias resulted to affect the measurement result of ± 1.8% on average (n=20, SE=0.010, CI=0.58). The natural marking covered on average the 24% of the dorsal fin (range 2 - 45%). The natural marking on a typical dorsal fin showed an overall gain rate of 0.8% per year (total whale years= 103, SE=0.07, CI=0.85) with some heterogeneity in marking gain rate among the gender/age classes.

Poster code : ECO-TRACE-11

Foraging ecology of Mediterranean fin whales in a changing environment elucidated by lead and mercury isotopes and trace elements.

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A good knowledge about the foraging ecology of Mediterranean fin whales is required in order to use efficient measures for the conservation of a species, mostly threatened by shipping collisions. Different studies have shown that fin whales mainly feed on M. norvegica and suggest that two fin whales' stocks exist: one in the Atlantic Ocean and a second in the Mediterranean Sea. Recents studies of carbon and nitrogen isotopic on baleen plates of Balaenoptera physalus stranded between 1975 and 2002 on North Western Mediterranean coasts and of sightings around Lampedusa Island in winter suggest a probable year-round distribution along synchronic seasonal dispatching, with a feeding behaviour occurrence in the Ligurian Sea during late spring and summer and in the Lampedusa area from late winter to early spring. However, the results are still insufficient to prove year-round residency of a large portion of fin whales' Mediterranean population. To obtain a more precise idea about the feeding behavior of Mediterranean fin whales and their migrations, other investigations will be done on the baleen plates using the potential provided by a combination of lead and mercury isotopes, and trace elements. The lead isotopes are useful geochemical tracers to distinguish distribution areas and potential anthropogenic pollution effects. The mercury isotopes be used to separate offshore and inshore individuals. At last, trace elements contents, including metals group, make it possible to discriminate the different specimens according to special characteristics such as their environment, sex, pregnancy, lactating females...

Poster code : ACOU-21

Comparison of cetacean distribution in the Aegean and Levantine Seas with ambient noise and shipping density

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Assessing threats to cetaceans in the eastern Mediterranean Basin is hampered by patchy survey coverage and limited baseline data. The *Song of the Whale* research team carried out 6382 km (25.5 days) of acoustic and 2434 km of visual survey effort between 7 July and 2 September 2013 along pre-defined tracks. A 400 m towed array was used for making audio-band (sampling rate 48 kHz) and broadband (sampling rate 192 kHz) recordings for sperm whales/delphinids and beaked whales respectively. Ambient noise recordings were made at discrete sampling stations using a calibrated omni-directional hydrophone. Sound pressure levels (SPL) ranged from 85 – 130; 75 – 115; 70 – 84 dB re 1 μPa for low (187.5 Hz); mid (1 kHz); and high (10 kHz) frequency bands respectively, with highest root mean square SPL (188 to 22,570 Hz) observed in the northern Aegean Sea (83 dB re 1 μPa). Analysis of Automated Identification System (AIS) ship location data showed concordance between shipping thoroughfares and SPLs. Cetacean distribution was mapped in relation to ship traffic and ambient noise levels, to provide a baseline for potential future investigations of risk of noise pollution and ship strikes for cetaceans in the region. Sperm whales were detected acoustically in the Anatolian Trough, Ikaria and Rhodes Basins and to the south of Cyprus. Beaked whales were recorded in the Ikaria Basin and to the south of Turkey. Six odontocete species (including false killer whale, rough-toothed and Risso's dolphins) and a single monk seal were observed in the Levantine Sea. No sightings were recorded of beaked or sperm whales despite acoustic confirmation of their presence, demonstrating the importance of passive acoustic monitoring.

Poster code : ACOU-22

Toward a passive acoustic monitoring of harbor porpoises along the French coasts: The pilot project MARSAC

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Static Acoustic Monitoring (SAM) provides a cost effective means to obtain year-round data, especially in areas where year-round visual surveys are not an option. The project aim was to determine the feasibility of long-term SAM to monitor the harbor porpoise along the French coasts as part of a Natura 2000 program. Small scale acoustic observatories were carried out in two sites on the west coast of France as a baseline. Eight click detectors (CPOD) were deployed in waters 16-55 m deep over a one year period. Many factors have to be taken into account for long term deployment in coastal shallow waters. Weather, currents, tide, bottom substrate, local fisheries and maritime authorities affect the choice of the deployment positions, the design of the mooring system and the deployment / recovery procedures. Deployment positions have been chosen with local fishermen and MPA managers. Seven different mooring systems were tested in well-contrasted environment in term of sea condition, substrate type (hard to very soft) and fisheries activity. Various deployment and recovery procedures were tested including divers and acoustic release. More than 1,500 C-POD days were monitored across all sites. Heavy structures on the bottom without surface buoy and mooring line with acoustic release were the most effective design. Up to this day, two CPOD has been lost due to nautical activities and battery failure of the acoustic release. Less than 10 % of data have been lost due to mooring issue or belated recovery of CPOD. Porpoise clicks have been detected in most sites. Our next step will be to analyze the seasonal and temporal patterns in distribution of harbor porpoise at each site in order to determine habitat use.

Poster code : ANA-PATH-19

Molecular and morphological evidence for the specific identity of 'Bryde's Whales' in the southern Caribbean

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Field identification of three proposed species in the Bryde's whale (Balaenoptera brydei, B. edeni, B. omurai) complex is difficult. As a consequence, their distribution is incompletely known. We opportunistically sampled four previously unidentified whales which stranded on Aruba, southern Caribbean, between 2001 and 2012. Phylogenetic analysis of mitochondrial control region sequences placed these individuals unequivocally within B. brydei. Photographs of the skull of one of these specimens showed three diagnostic anatomical characters of B. brydei. These represent the first records of B. brydei for Aruba. Our results further suggest that the Aruban Bryde's whales, and one from Madeira, are part of an offshore clade previously identified from South Africa. This study represents the first explicit test of the specific identity of the 'Bryde's whales' in the Atlantic Ocean and the Caribbean. We stress the importance of molecular confirmation of 'Bryde's whales' across the Caribbean and Atlantic, and argue that records are best left unidentified unless similar, closely related species have been explicitly excluded on the basis of diagnostic morphology or DNA.

Poster code : ECO-TRACE-12

Longer and less overlapped food webs in anthropogenically disturbed marine ecosystems: confirmation from the past.

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Human exploitation of marine resources is characterized by the preferential removal of the largest species. Accordingly, the current pattern of distribution and the ecological role of marine megafauna, including marine mammals, do not necessarily correspond to those natural. Retrospective studies allow assessment of shifts. The marine ecosystems off Argentina have suffered major anthropogenic changes during the past two centuries due to sealing and industrial fishing. These impacts caused a reorganization of the entire ecosystem that could have led to a new equilibrium state. Here we used stable isotope analysis and quantitative methods (i.e SIBER) to analyze changes in the topology of the marine food web during the last 6000 years in northern and southern Patagonia, with a particular focus on pinnipeds. The stable isotope ratios of carbon and nitrogen in the shell of intertidal molluscs were used to infer changes in the isotopic baseline and those in modern and archaeological bones of South American sea lions, South American fur seals and Magellan penguins were used to understand changes in trophic level and topology of top predators within the food web. We found that ancient food webs were shorter, more redundant and more overlapped than current ones, with today pinnipeds and penguins foraging at higher trophic levels. These counter-intuitive results are the consequence of the intense exploitation of pinnipeds during the 19th and 20th centuries, as their current population number is still much lower than originally. In this scenario, fur seals and sea lions remain well below the carrying capacity of the ecosystem; they were relieved from intraspecific competition and consume larger prey than 6000 years ago. On the other hand the penguins may have taken advantage of decreased competition from pinnipeds (especially fur seals) thus feeding better prey.
Research carried out with the support of the Fundación BBVA.

Poster code : ANA-PATH-20

Seal lice as vector for heartworm larvae: heartworm lifecycle and prevalence in harbour seals

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The seal louse (*Echinophthirius horridus*) and the heartworm (*Acanthocheilonema spirocauda*) are parasites of the harbour seal (*Phoca vitulina*). It is assumed that the seal louse is essential for the development of the heartworm and acts as vector for the transmission of larvae to the final host. During the health-monitoring of seals along the German coast between 1996 and 2013, 1.509 dead harbour seals were collected and examined. Only 35 (2.32%) harbour seals were infected with adult heartworms and 26 (1.72%) carried seal lice. The highest prevalence and level of infection with heartworms and seal lice was found on immature seals (7-18 months). Harbour seals (n=103) were captured on sandbanks in the North- and Baltic Sea during spring and autumn between 2008 and 2013. Medical examinations including haematology were performed before their release and microfilaria of A. spirocauda were discovered in blood smears of 43% (n=103) of the harbour seals. The number of animals caught for the health-monitoring of living harbour seals is predominated by adult individuals. Nevertheless, the blood smears of immature seals showed the highest prevalence and level of infection with microfilaria. In this study one larval stage of the heartworm was found in one ethanol-fixated seal louse (n=35) from a dead seal. The detection of a larval stage in a seal louse corroborate the hypothesis that heartworms need seal lice as intermediate hosts for development and as vectors for their transmission. Discovered differences in heartworm prevalence indicate a higher infection level in the population than previously assumed. The age dependence in prevalence and level of infection may show that the transmission of seal lice and heartworms occurs horizontally between immature seals on land. The host-parasite-interaction analyzed is an exception and can be seen as a relic of their terrestrial ancestor's parasite fauna considering the seal's amphibian modus vivendi.

Poster code : ACOU-23

Detection of fin whales calls through a digital seismic hydrophone (Eastern Sicily, Ionian Sea)

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An increasing number of surveys over the last few years definitively confirmed the presence of a genetically isolated subpopulation of fin whales (*Balaenoptera physalus*) in highly productive areas of the Mediterranean Sea. Despite this, still very little is known about the trends the population follows seasonally within the whole basin and, particularly, in the Ionian area. The most common Mediterranean vocalizations are known as "20Hz pulses" and grouped in two main types of calls: type "A", downswept (17Hz <f< 23Hz) and type "B" with constant 18-20 Hz frequency. In June 2012 the real-time deep sea multidisciplinary observatory "SN1-EMSO", was deployed and connected 25 km off the port of Catania (East Sicily), at a depth of 2100 m. The platform was equipped with a low bandwidth seismic hydrophone SMID DT405D (1Hz <f< 1kHz) allowing us to monitor fin whales travelling across the region. Data were sampled 24h a day, saved in 10 minutes long files and analyzed using a MATLAB® software developed for the study, which automatically saves the spectrogram of the band below 50Hz. Within the activities of the SMO experiment almost a full year of data has been analyzed by spectrographic analysis and calls of both "A" and "B" types were detected in different months. Our results demonstrate the potential of the Passive Acoustic Monitoring using acoustic antenna aboard deep sea multidisciplinary observatories, such as EMSO and SMO. We also confirmed the presence of fin whales offshore Catania supporting previous occasional observations, which lets us consider the Ionian Sea a possible major route through a seasonal migration of the species. The long term acoustic monitoring activities of KM3NeT and EMSO will give us the chance to better understand animals' occurrence in the area and to investigate their acoustic behavior and population ecology.

Poster code : ACOU-24

Acoustic signals of white whales summering in the north-eastern Sea of Okhotsk, far east Russia

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Here we present the first data on the acoustic repertoire of white whales from the north-eastern Sea of Okhotsk. In the period of 2010-2012 over 34 hours of vocalizations of white whales summering in the river estuaries of western Kamchatka were recorded. Based on time-frequency characteristics the recorded sounds were classified into tonal signals (whistles) and pulsed signals presented by pulsed tones and click series.
Whistles were the most common acoustic sounds of the whales: the percentage of these signals amounted to 53-71% of all sounds. The less part of vocalizations consisted of pulsed tones (21-32%) and click series (8–16%). Whistles and pulsed tones were presented by signals with stable (stereotype) or variable structure. Both tonal and pulsed stereotype signals were characterized by distinctly expressed structural peculiarities and were often produced in series. Statistical analysis showed that the overall vocalization rate as well as the rate of different sound types used by whales depended on the behavioral context. The overall vocalization rate varied from 0.03 to 33.5 sounds per minute and was significantly higher during social interactions and feeding of whales than during other types of behavior, especially such as resting or anxiety situations. During hunting on fish – the key type of the behavioral activity in the observed whales – the most significant type of sounds were stereotype whistles. For example, on average during salmon chasing the whales produced 1.7 stereotype whistles, 0.2 variable whistles, 1.1 pulsed tones and 0.6 click series per minute.
According to our data stereotype whistles play the key role during active feeding of white whales. We suppose that in conditions of poor visibility typical for the investigated rivers such signals could play an important function of identification and coordination of whales during hunting.

Poster code : ABU-17

Bowhead whales (*Balaena mysticetus*) sighting in the Franz Josef Land area.

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Prior to human predation there were five geographically distinct, permanent, and robust Bowhead stocks: the Sea of Okhotsk stock, the Bering Sea stock, the Hudsons Bay stock, the Davis Strait stock and the Greenland–Spitzbergen stock. Over the entire 1611-1911 period of human predation there were 120507 Bowhead whales taken from the Greenland–Spitzbergen stock, though the initial estimated population number was approximately 52500 adult Bowhead whales. In 1911 the British whaling vessel spent an entire season off the east coast of Greenland and did not sight, much less land, a single Bowhead whale, as the date of virtual extinction for this stock. Today, the Spitsbergen stock of Bowhead whales is believed to number in the tens and is considered critically endangered by the IUCN. During the monitoring on the way to the Franz Josef Land, on August 31 2013, two Bowhead whales were sighted not far from the Guker Island (latitude 79,795, longitude 51,588). On July 22 and 23 2013, from an observation station on the Graham Bell Island two Bowhead whales were observed at coordinates: latitude 63,982, longitude 81,092; latitude 63,989, longitude 81,091. The whales slowly moved to the north, since the animals were observed approximately at the same location and on different dates, it might be the same individual. The V-shaped blow and the head shape allowed the Bowhead whales to be distinguished with no doubts. Belikov et al. (1989) reported several observations of possible bowhead whales in the area of Franz Josef Land in the period 1971 to 1985. A total of 34 whales were observed from airplanes during ice reconnaissance flights. Therefore according to the current information the status of this stock seems to be better than earlier believed.

Poster code : ANA-PATH-21

Bottom-up effects of food abundance on body condition of seals in the Barents and North Seas.

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Mechanistic links between prey availability and top predator populations in marine ecosystems are typically complex. We investigate the temporal relationship between body condition and prey abundance for two capital-breeding phocids, harp seals (Pagophilus groenlandicus) and grey seals (Halichoerus grypus) in two contrasting systems, the Barents Sea (polar, "simple" food web) and North Sea (temperate, "complex" food web). In the Barents Sea study cross-sectional body condition data is assessed from measurements of blubber thickness in 1+ seals sampled in the southeastern part of the region, after the breeding season, early in the year from 1992-2011. In the North Sea grey seal study, we use a long-term longitudinal data set between 1990-2011 from the Isle of May (IoM), Scotland, where masses of known adult females are measured shortly after the birth of pups.

Common to both studies, we find (i) good evidence for variation in seal body condition between years, (ii) evidence for positive effects of prey abundance (krill for harp seals and sandeels for grey seals) and also (iii) evidence for negative effects of prey abundance (e.g. increased cod abundance is associated with decreased harp seal condition). This last may seem counter-intuitive, but could arise plausibly through indirect effects such as competition between harp seals and their fish prey for shared prey resources.

In the Barents Sea, there are correlations between average maternal condition and net pup production in the harp seal population. In the North Sea study, where maternal condition appears to be affected by food availability, we also know that pup mass at weaning predicts apparent pup survival. Therefore evidence from both studies, in different systems, at different times and at different 'levels' of analysis (whole population vs individual studies) suggests a direct link between broad indices of food abundance, maternal condition and reproductive success in these capital-breeding animals.

Poster code : ECO-7

Microbiological monitoring of the western gray whale (*Eschrichtius robustus*) and its habitat as additional method for assessment of short-term and long-term influence of oil-petroleum industrial activity upon the free-swimming population of this species.

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At the present time Russia (viz the Ministry of Natural Resources and Ecology of the Russian Federation) in cooperation with the Global Ecological Fund (GEF) and the Program of Development of the United Nations (UNDP) develops the joint project directed on introduction of principles of biodiversity preservation in oil-petroleum industry,hydroenergetics,coal industry,also on development of standard legal preconditions for practical realization of these actions.Actively developing reclamation of hydrocarbonic resources represents real risk of marine ecosystems destruction. Thus most ecologically vulnerable species are large cetacean.Grey whales (Eschrichtius robustus) of the Okhotsk-Korean population, polar (Greenland right) whales of Okhotsk population, humpback and smooth (Japanese) whales are included in the Russian Federation Red Book, as being under threat of disappearance.As part of project,program develops according to short-term and long-term influences of various forms of economic activity (seismic exploration,marine platforms installation,ground pipelines laying,vessels movement,etc.) to the grey whales health status and its habitat.This program will include studying of pathological changes in the individuals of a gray whale connected with:1) toxins accumulation;2) traumatizing at collision with vessels,by-catching,acoustic blows;3)exhaustion;4) the susceptibility increasing to pathogenic and opportunistic causative agents of infectious diseases, etc.In this connexion it was offered to include microbiological monitoring whales and its habitat in this program for identification of circulating pathogenic and opportunistic microorganisms into natural populations.In 2011 blow sampling from 20 grey whales in the Olga's Bay (Kamchatka Peninsula) was made.As a result from 86 % of samples have been isolated microorganisms of genuses: Staphylococcus,Pseudomonas,Bacillus,Streptococcus, Candida and others. Respiratory microorganisms have been isolated from 8 whales. One Staphylococcus spp. was with pathogenic factors: hemolytic (binary zone of hemolysis) and plasma-coagulase positive. Different pathogenic microorganisms were isolated from 6 whales.

Poster code : PHOTO-7

Assess the level of social interactions in females bottlenose dolphin (*Tursiops truncatus*) of two different Italian populations.

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This study investigated tooth rake scarring patterns and dorsal fin notches on females bottlenose dolphins (Tursiops truncatus) to evaluate the level of social interactions in two different Italian populations. Multiple photographs of 59 known animals, 31 from Ischia island (IS) and 28 from Tuscany Archipelago and mainland (TA), were examined. We focused on the dorsal fin and the upper part of the body, from the rostrum to the posterior peduncle, on both left and right side. The following number of animals resulted appropriate for the aim of this study: 53 (n=27 from IS and n=26 from TA) and 40 (n=17 from IS and n=23 from TA) for the dorsal fin right and left side, respectively; 25 (n=17 from IS and n=8 from TA) and 24 (n=12 from IS and n=12 from TA) for the right and left side of the anterior part of the body, respectively; 27 (n=13 from IS and n=14 from TA) and 23 (n=10 from IS and n=13 from TA) for the right and left side of the posterior part of the body, respectively. Individuals of the two populations showed clear differences in the presence and abundance of the marks. Females sampled around Ischia island were less marked than those encountered in the Tuscany Archipelago, both in tooth rake scarring patterns and number of dorsal fin notches. These results may be related to significant differences in group size between populations and possible variations in the interaction with human activities (i.e. fishery). Since both populations showed high level of association with fishery, group size seems to be particularly relevant, with lower values in group size, like those observed in the TA population (about 20 animals), appearing to strengthen social interactions (higher number of marks) and larger ones like those encountered around Ischia island (about 40 animals) limiting them.

Poster code : REPRO-7

Identification of physiological status of fin whales (North-West-Mediterranean Sea) through analysis of reproductive hormones in blubber.

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The purpose of this study was to assess the possibility of monitoring the reproductive activity of fin whales by measuring the steroids extracted from blubber collected by biopsy on living animals. During 4 years (2010 to 2013) 278 biopsies were collected in the north-western Mediterranean. The sex was determined through the amplification of the specific DNA fragments of the gene ZF-X and ZF-Y. Steroids were extracted from blubber by heating and measured by radioimmunoassay. In 2010 and 2011, steroids rates indicated that 52 % and 43 % of females were pregnant and two thirds of males were active stallions. These results suggested a pregnancy rate of one calf each two years, in the top of the range found in the literature. But in 2012, the proportion of pregnant females dropped to 11%. This can be interpreted as a reproductive rest along with a certain synchronism within this group of female fin whales spenting time in the NW Mediterranean, or as an anomaly in the pregnancy rate with causes to be investigated. Results of 2013 will be available in December and might help us to choose between these two options.

Poster code : ABU-18

Distribution and ecology of Indo-Pacific bottlenose dolphins and humpback dolphins in Menai Bay, Zanzibar

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Populations of Indo-Pacific bottlenose dolphins (Tursiops aduncus) and humpback dolphins (Sousa sp.) inhabit the Menai Bay Conservation Area off the south-west coast of Zanzibar, Tanzania. Previous studies in the area have investigated species distribution and impacts of anthropogenic factors on distribution, abundance and behaviour. The effects of biotic and abiotic factors remain largely unexplored. The current study uses cetacean click recorders (C-PODs) to investigate biotic and abiotic factors and their effects on dolphin occurrence. C-PODs allow for monitoring over longer periods of time and are largely unaffected by the environmental conditions (weather, light level etc.) and human error that hamper traditional survey methods. 3 C-PODs were deployed at locations with similar depth off the island's fringing reef, but were subject to different levels of boat tourism activity. Factors analysed include: location, temperature, diel cycle, tide, season, primary production (as a proxy for prey abundance), bottom type and bathymetry. Analyses of anthropogenic impacts, namely fishing and tourism, were also studied for comparison with previous research. The data analysed (dolphin encounters, click detection positive minutes and click train frequencies within encounter) show statistically significant differences in dolphin distribution and occurrence, correlating with specific factors. Occurrence was lower during daylight hours at two of the study locations. Abundance increased with slope steepness; however increased mean depth did not correlate. Tourism showed greatest correlation with dolphin occurrence, the control site (no tourism) show no change in occurrence throughout the day, those with tourism showing clear patterns of occurrence reflecting the impact level. Further, analyses of broadband echolocation click data has allowed for initial exploration of effects of location and diel cycle on the click behaviour in the studied odontocetes. This work has implications for the conservation of both species, feared to be in localised decline, which are important for the local socio-economy.

Poster code : ECO-8

Variability of the mitochondrial control region in the populations of the Black Sea harbour porpoise (*Phocoena phocoena relicta*) in the Turkish Seas

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Black Sea harbour porpoises (*Phocoena phocoena relicta*) are endangered animals and the population structure needs to be understood in order to elaborate effective conservation measures. Mitochondrial DNA sequences of 55 individuals of the harbour porpoise sampled between 1999 and 2013 in the Turkish Black Sea coast (33 western, 13 eastern), Istanbul Strait (2), Marmara Sea (5), Çanakkale Strait (1) and Aegean Sea (1), revealed 14 polymorphic sites, resulting in 15 different haplotypes. None of the haplotypes obtained in this study clustered with those of the Atlantic populations, consistent with previous findings. The Black Sea haplotypes sequenced had been previously detected from the Black Sea coast of Bulgaria, Ukraine, Georgia, and Turkey. Four haplotypes were recorded for the first time in Turkish waters. One haplotype which had been previously detected in the Northern Aegean Sea (Greece) was detected for the first time in the Black Sea, in two individuals. Six (4 western, 2 eastern part) unique haplotypes were found in the Black Sea samples. The most common haplotype in our data set was recorded in one individual stranded in Bodrum (southern Aegean Sea), and also in the Marmara Sea (4), Istanbul Strait (1) and Çanakkale Strait (1), supporting the idea that harbour porpoises from the Black Sea dispersed into the Aegean Sea through these straits. One of the samples from the Marmara Sea sequenced in this study had the same unique haplotype as found in four individuals from the same sea in earlier studies, strengthening the possibility of an isolated population in the Marmara Sea.

Poster code : HUMA-12

Feeding habits of franciscanas, *Pontoporia blainvillei*, based on stable carbon and nitrogen isotopes in tooth dentin

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Franciscanas (*Pontoporia blainvillei*) are small dolphins endemic to shallow coastal waters in the southwestern Atlantic Ocean. The species is especially vulnerable to anthropogenic activities, mainly impacted by by-catches in gillnet fisheries. Understanding their feeding habits helps implement conservation measures, aiding the designation of protected areas and the quantification of interactions with fisheries. We characterized sex- and age-related foraging in franciscanas by-caught in southern Brazil. Carbon and nitrogen stable isotope ratios, expressed as δ13C and δ15N, were measured in the tooth dentin of calves, juveniles and adult dolphins. δ 15N was negatively correlated with Body Length (BL) and age, which was attributed to decreasing influence of the suckling period. Correlations of δ13C with BL and age show slight enrichment in 13C in adults. No significant differences in isotope signatures between genders indicate that both sexes forage upon the same resources. Stable isotopes were measured in prey species selected based on previous studies on analysis of stomach contents (SCA). Isotope mixing models were applied to estimate the fractional contribution of prey items to franciscanas' diet. Although some differences in the relative contribution of the main preys were found when comparing both methods, results from mixing models agree with those of SCA. Isotope analysis identifies a resident fish species as highly important to the diet of adult dolphins. Nevertheless, isotope values in younger individuals may be biased by the high relative contribution of the dentin deposited during nursing in this species and caution is necessary when interpreting these results. The present study is the first to characterize the ontogenetic dietary shifts in franciscanas by analyzing their isotopic signatures. For more reliable dietary information, we recommend that both methods (SCA and stable isotopes) be applied when studying the foraging behavior of marine mammals.

Poster code : REPRO-8

Temporal and spatial patterns of humpback whales in the Sainte Marie Island, Madagascar, breeding ground

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Humpback whales migrate seasonally between low latitude breeding grounds and high latitude feeding grounds. The Sainte Marie channel (Est coast of Madagascar) is an important calving and breeding spot for humpback whales, Megaptera novaeangliae, in the Southwest Indian Ocean. However, little is known on the breeding phenology and habitat use of humpback whales in this significant breeding area. The Sainte Marie channel is 30 km wide and is characterized by a shallow bathymetry (≤ 60 m), a feature that has previously been related to the mother and calf group distribution. We used sightings data collected on board 14 whale watching boats to examine the temporal and spatial segregation of different social group types of humpback whales (singletons, pairs, mother-calf pairs, mother-calf-escort, competitive groups) during the breeding season. Data were collected from 2009-2013 between June and September in the south of Sainte Marie channel. A total of 4854 sightings were recorded during 1251 trips. The first whales arrived in late June. The season peaked in July and August and most of animals had left the area in September. The proportion of group types changed over time with more singletons and pairs observed at the beginning of the season that at the end. The greater occurrence of groups with calf is observed in August (60%) and the number of escorted mother-calf pairs remained stable when the season progressed. The mother and calf pair sightings were more frequent within 0-30 m depth range than other group types. Distance from shore is also influencing the distribution of humpback whales in the Sainte Marie channel. When compared to fine scale studies conducted in other regions, our results confirmed the existence of a temporal and spatial dynamic of group types over the breeding season.

Poster code : CONS-18

Marine mammals and debris – potential conflict in the German North Sea

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The amount of marine debris in the world's oceans is increasing. Therefore, more attention is given to possible impacts of manmade products (e.g. ghost nets, plastics) on the marine environment in modern research. The evaluation of the effects of marine debris is crucial, as is the identification of their sources to create effective protective measures e.g. marine protected areas.
Since 2002, the Institute for Terrestrial and Aquatic Wildlife Research (ITAW) in Büsum (Germany) conducts aerial surveys to gain information on the abundance and distribution of harbour porpoises (Phocoena phocoena) in the German North and Baltic Sea. This includes the NATURA 2000 sites of community interest (SCIs) of the German Exclusive Economic Zone. During the aerial surveys information on all sighted floating debris is recorded as well.
Here, we analyse seasonal and annual variations of marine debris occurrence within the SCI Sylt Outer Reef, which represents an important aggregation area for harbour porpoises and includes a calving and nursing ground.
Line transect distance sampling data from 2002 – 2012 were analysed in GIS to evaluate spatio-temporal distribution patterns of marine debris to judge potential implications for harbour porpoises and deduce potential origins. Results indicate high densities of marine debris with distinct geographical and seasonal patterns. Recorded debris included a high share of debris originating from fisheries, posing an increased risk with respect to entanglement for harbour porpoises in the area.
Since the contamination with marine debris in this area is particularly high, the potential for conflicts is rising and possibly deteriorates the quality of the nature reserve. We discuss potential management actions for debris removal and prevention of further introduction of marine debris within this sensitive area for harbour porpoises.

Poster code : ANA-PATH-22

Toxoplasma gondii in marine mammals

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Toxoplasma gondii is a zoonosis of worldwide distribution, it has been found in many different species of warm-blooded animals. Felids act as the end-host in the lifecycle of T. gondii and it is assumed that all warm-blooded animals can act as intermediate host. Because of the absence of felids in the marine environment the presence of T. gondii in marine mammals is surprising. Several studies have shown the presence of this parasite in marine animals. Although disease or pathology associated with toxoplasmosis is rare in marine mammals, it is possible for marine mammals to develop clinical symptoms, mostly due to immunosuppression. In this study, we investigated the presence of the parasite in samples from stranded marine mammals from the Dutch, Belgian, United Kingdom and German coast by using PCR and serological testing (MAT, Modified Agglutination Test). Preliminary results from samples from stranded marine mammals on the Dutch coast show that this parasite is infrequently present in these stranded animals. One positive animal out of 102 individuals (0,98%) was found using PCR. Serologic testing on 81 animals showed 33 positive animals (41%), but only at the lowest dilution (1/40). Different transmission routes (such as coastal run-off, mechanical vectors) and predisposing factors (such as Polychlorbiphenyls, Morbillivirus) are hypothesized and some indications have been found, but these are still insufficiently investigated. Since T. gondii is able to infect humans, research on the spreading of T. gondii in the marine habitat is relevant for public health in areas where marine mammals are consumed. In European regions the relevance of this research is in the fact that T. gondii in marine mammals act as an indicator for the pollution of the marine environment. Marine mammals, being at or near the top of the food chain, act as sentinels for the marine environment.

Poster code : ABU-19

If you can't beat them, eat them - Behavioural observations of grey seal (*Halichoerus grypus*) and harbour seal (*Phoca vitulina*) interactions on the island of Helgoland, Germany.

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On the German island of Helgoland Düne, harbour seals (*Phoca vitulina*) and grey seals (*Halichoerus grypus*) haulout together on the beaches in mixed groups. The island is also intensively used by tourists, as the main recreational beach is on Helgoland Düne. A young male grey seal, estimated to be around 6-7 years of age, was observed in July - September 2013 preying upon young harbour seals. A harbour seal carcass with severe traumatic lesions suspected from the grey seal attack was retrieved soon after. In the following weeks several carcasses showing similar lesions were found and post-mortem examinations were performed. Additionally, further observations of the same individual preying upon young harbour seals were made. Evaluation of the observed behaviour suggests that the grey seal did not attempt to minimise handling time during harbour seal predation, rather the behaviour resembled play as seen in other pinniped species. The grey seal has been identified as a non-resident on the island with a so far unknown past and has left Helgoland after staying approximately two months. Reports of grey seals attacking other marine mammals are rare and mainly unconfirmed with the exception of potential attacks on harbour porpoises (*Phocoena phocoena*) in the southern North Sea and in the case of intra and interspecific infanticide. To our knowledge, this is the first recording of a grey seal preying upon a harbour seal in German waters. Young male grey seals on Helgoland were also observed, interacting with harbour seals in a way akin to mating behaviour in contrast to predation. Further investigations into the behaviour of, and interspecific interactions between these species are needed, especially in light of increasing population sizes and a growing number of tourists in this area.

Poster code : DISTRI-12

Faroe Islands Whale Research: a cetacean distribution study to assess the feasibility of whale watching in the Faroe Islands.

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The Faroe Islands are a group of 18 islands in the North Atlantic situated between Scotland and Iceland. Thirteen species of cetaceans are regularly observed around the Islands, but little is known about the inshore distribution of most species. At present there is no tourism industry dedicated to cetaceans, since no hotspots have been identified. However, the species richness of inshore sightings shows potential for the development of this industry. A cetacean distribution study was conducted between May and July 2013 in order to assess the feasibility of whale watching. Dedicated land-based surveys were conducted at three key sites. In addition, a number of opportunistic land and vessel-based watches were performed. A public sightings network was also developed and sightings reported via the public were collected. In total 109.87 usable hours were spent watching during land-based surveys at the locations. During these hours, 35 cetacean sightings were recorded; a sightings rate of 0.18 cetaceans per hour. Three species were confirmed during these watches in addition to a sighting of an unidentified cetacean. Initial results suggest that two of these sites may show potential for the development of whale watching, with sightings rates of 0.38 and 0.21 sightings per hour at Hoyvik and Velbastaður respectively. Combining all records to include additional watches and reports from the public sightings network, 74 sightings were collected over the duration of the project, consisting of 10 species. In summary, this study has started to build a picture of potential sites for whale watching. The Faroe Islands remains a challenging location, where sightings and weather can be unpredictable. However, the high species diversity and regularity of sightings of suggests that the Faroe Islands has the potential to incorporate either land or boat based whale watching as a tourism activity, though further research is required.

Poster code : ABU-20

Estimating the consequences of the 2006-07 Morbillivirus epizootic on the long-finned pilot whales in the Strait of Gibraltar

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Since 1999 abundance, trend, survival rate, spatial distribution, diet and conservation issues have been studied on the resident long-finned pilot whales (Globicephala melas) in the Strait of Gibraltar. Therefore, it was a unique situation where a population status had been known before possible variations could occur. In winter 2006-07 a Dolphin Morbillivirus (DMV) outbreak has been detected with an increase in stranding animals in the region. Ten animals stranded in 5 months while the average was 0.9/year in 1998-2006. Histopathological studies performed by the University of Las Palmas de Gran Canarias (Spain) confirmed the presence of DMV in the stranded animals. This study investigated the consequences of the epizootic on the population of long-finned pilot whales in the Strait of Gibraltar. Pradel's Closed Robust Design models were implemented in MARK using photo-identification as mark recapture from 1999 to 2011. Best model (AIC) estimated a high constant pre-DMV survival rate of 0.990 (95%C.I.: 0.978-0.996) in 1999-2006, then a decrease down to 0.759 (95% C.I.: 0.697-0.812) in 2006-2007 during the DMV outbreak and finally a post-DMV increase up to 0.889 (95% C.I.: 0.850-0.919) in 2007-2011. The DMV increased the mortality rate by 25 times the year of the outbreak. Although the mortality decreased after 2007, it has not come back to pre-DMV levels. This study assesses the demographic consequences of a Morbillivirus epizootic on live pilot whales in their natural environment. It also suggests a post-DMV effect which is yet to be investigated. Some hypotheses could be the persistence of an enzootic DMV in the population, the presence of chronic DMV central nervous system infection such as the one found in the Mediterranean striped dolphins, a decrease in prey availability, an increase of anthropogenic pressure or a combination of factors.

Poster code : ECO-9

Tyrrhenian seamounts influence on pelagic visitors: cetaceans, sea birds, sea turtles and pelagic fishes.

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Seamounts are fundamental features for the Mediterranean marine ecosystem functioning. The main characteristic of seamounts is that they tend to accelerate water currents, thus affecting the general circulation of the water masses they generate favorable conditions for higher productivity and biodiversity. For this reason seamounts have been considered aggregation areas for many "visiting" pelagic species. Most seamounts probably act as stepping stones, supporting the feeding activity of many top predator species. This characteristic make seamounts important areas to protect biodiversity. This was confirmed by the fact that some of these structures were recently classified as EBSA (ecologically or biologically significant areas). In this work we used data collected in the Tyrrhenian sea in order to evaluate seamount effect on 4 categories of animals: cetaceans, sea birds, sea turtles and pelagic fishes. Frequency distribution of the distances to seamount summit were calculated for each category, with the aim to investigate the range of seamount influence. During 2013 we sampled 46 seamounts covering 1.736 nautical miles and 476 hours were spent on effort. Species detection were conducted by visual and acoustic surveys. We registered 397 sightings (60 cetaceans, 273 sea birds, 35 sea turtles and 29 pelagic fishes) and 21 positive acoustic detection of cetaceans. This work is part of the research project called "PROMETEOS" funded by MAVA Foundation and coordinated by IUCNMed, "MENKAB: il respiro del mare" association is partner of the project. This study is an important contribute to design seamounts conservation area in the Tyrrhenian sea.

Poster code : ABU-21

Abundance of Harbour porpoise within the Kattegat, Belt Seas and the Western Baltic

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In July 2012, a ship-board double-platform line-transect survey was conducted to assess harbour porpoise (Phocoena phocoena) abundance in the Kattegat, Belt Seas and the Western Baltic, comprising the area for which ASCOBANS adopted the new 'Conservation Plan for the Harbour Porpoise Population in the Western Baltic, the Belt Seas and the Kattegat' in 2012. A total of 826 km of track lines were surveyed between the 2nd and 21st of July 2012 and 169 observations were made by the primary observers, comprising a total of 230 porpoises. Using Mark-Recapture Distance Sampling analysis, we produced model based density estimates for the harbour porpoise within the survey area. Using a point independent model of the detection function, the abundance of harbour porpoises within the survey area was estimated at 40,475 animals (95% CI: 25,614 – 65,041, CV = 0.235) with an associated density of 0.786 animals km^{-2} (95% CI: 0.498 – 1.242, CV = 0.235) and an average group size of 1.488 animals. These results reflect densities obtained during the SCANS surveys in 1994 and 2005, indicating no significant population trend in the area. However, it should be noted that the survey area covers more than the range of one population and that results are therefore not necessarily reflecting local population trends. The abundance estimate provides baseline data for future monitoring and is an important input to the assessment of the conservation status of harbour porpoises in the area.

Poster code : ANA-PATH-23

Intestinal volvulus in phocids from Germany during the last 16 years

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Harbor seals (*Phoca vitulina*) and grey seals (*Halichoerus grypus*) are the two most common phocid species in German waters. Both seal populations in the Wadden Sea have reached highest numbers since counting was conducted trilaterally. The harbor seal population has been diminished twice due to phocine distemper epizootics in 1988/89 and 2002. Therefore assessment of health status is part of the monitoring of the seal populations in the Wadden Sea.
Over the last 16 years pathological examination were conducted on more than 1000 dead harbor and grey seals. Between 1997 and November 2013 22 (eight adult males, one male yearling, 13 adult females) free-ranging harbor seals and two grey seals (two adult males) found on the coast of the North and Baltic Seas of Schleswig-Holstein that had died due to intestinal volvulus. Moreover, one harbor seal from human care died due to intestinal displacement. The majority of these seals were in a good or moderate nutritional status. Pathological findings comprised 600 ml to 12 liters of hemorrhagic effusion in the abdominal cavity. The intestine showed torsion (180°- 3x180°) along the mesenteric axis, resulting in vascular obstruction and haemorrhagic infarction. In addition, in a few cases an invagination of the small intestine was present. Microbiological examination revealed the presence of different bacterial species whose relevance remains to be elucidated. Parasites were found in eight intestines and 12 stomachs of these animals. A pregnancy was determined in five females.
Intestinal volvulus seems to be a cause of death in free living and captive harbor and grey seals and has also been described for harbor porpoises. The etiology of intestine volvolus will be discussed.

Poster code : ECO-TRACE-13

Baseline levels of Pops and Meo-PBDEs in melons, mandibular fat, blubber and liver of Harbour porpoises from the North Sea

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Previous studies have suggested that pollution can lead to impaired immune systems in marine mammals, thereby leading to illnesses. For conservation purposes, it is therefore useful to follow up on the pollution status of these animals. Over the years, this has been done mainly by analyzing blubber samples because blubber is the primary tissue for storage of lipophilic compounds. Levels of persistent organic pollutants (POPs) and methoxylated polybrominated diphenyl ethers (MeO-PBDEs) are typically high in marine mammals worldwide including in harbour porpoises from the European North Sea. In the European North Sea, harbour porpoises are top predators and a key species in the North Sea ecosystem which makes them worthwhile to investigate. In the present study, levels of POPs and of MeO-PBDEs were analyzed in blubber, liver, melon and mandibular fat samples of harbour porpoises from the North Sea. Of these four tissues, melon and mandibular fat are metabolically inert, whereas blubber and liver are not. Blubber and liver were included to allow comparisons with previous studies and species and to be able to use the existent bioaccumulation models for harbour porpoises. Melons and mandibular fat samples will allow the expansion of the current bioaccumulation models with two more compartments and the subsequent investigation on how and if the patterns and trends of POPs and MeO-PBDEs in the melon and mandibular fat resemble those in the blubber and liver.

Poster code : BEHAV-13

Activity budget of husbandry-trained Cape fur seals (*Arctocephalus pusillus*) in the Wroclaw Zoo, Poland

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Positive reinforcement training (PRT) helps minimize the stress caused by living in captivity and is a commonly used method of enhancing animal welfare. However, it is argued that due to the predictability of training sessions it may give a reverse effect and could potentially increase abnormal behaviors. The aim of our study was to examine the time budget of captive Cape fur seals (*Arctocephalus pusillus*) and to evaluate the effectiveness of PRT not directly after it has been implemented, but when animals were used to the daily routine and training sessions. Behavioral data for three fur seals were collected in the Wroclaw Zoo. Previous preliminary observations have noted the presence of stereotypic behavior in these individuals. Husbandry training was implemented twice a day, during feeding, at regular times and began 9 months prior to the beginning of data collection. Over 300 observation hours per individual, spread over a 12-month period, were collected and analyzed, considering also a potential effect of environmental factors on behavior. The observed individuals spent a majority of time on active swimming (mean: 35, 38 and 42 min/h). There were significant differences in the amount of interactions between individuals ($X^2=246.0756$, $df=2$, $p<0.001$), and a pattern of increased interaction rate in the hour of training sessions was visible. Time spent in water and on land was significantly dependent on the time of the day (Kruskal-Wallis test: $X^2=177.7546$, $df=11$, $p<0,0001$), with more time spent on land as the day progressed. We noted significant correlations in time spent on land with water (Kendall's correlation: $tau=0.09$, $z=5.3658$, $p<0.0001$) and air (Kendall's correlation: $tau=0.133$, $z=5.3225$, $p<0.0001$) temperature. No stereotypic behavior was noted throughout the study. These preliminary data show that PRT can be an effective long-term enrichment and can largely benefit the welfare of fur seals in captivity.

Poster code : BEHAV-14

Traumatic intra-/interspecific interactions as a cause of mortality of stranded cetaceans in the Canary Islands

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From December 1999 to April 2013, a total of 574 cetaceans were stranded in the Canary Islands and a systematic and comprehensive pathological study was carried out in 405 specimens. Some cases showed severe traumatic injuries due to anthropogenic activities related to fisheries and vessel traffic but also to natural causes such as interactions between animals. A retrospective study revealed the presence of lesions related to intra- or interspecific in 31 (7.65%) out of 405 cases (including 13 different species). The most common observed lesions were hemorrhages (found in 29 out of 31; 93.55%), tooth marks in skin (18 out of 31; 58.06%) and fractures (14 out of 31; 45.16%), mainly located in the thorax but also on the head. Six out of 31 animals (19.35%) showed multiple fractures, sometimes bilateral, and other discrete lesions distributed along the body suggesting a repeated impact (on more than one direction) (Dunn et al., 2002). Final diagnosis was highly consistent with interaction between animals in 20 out of 31 (64.51%) cases. Other etiologies of trauma were not completely ruled out in 8 (25.81%) cases and the cause of death remained inconclusive in 3 cases (10%), due to advanced decomposition of the carcasses.

Poster code : BEHAV-15

Quantitative analysis of the habitat use by bottlenose dolphins in the Cres-Lošinj archipelago (Croatia)

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Habitat use by a resident bottlenose dolphin (*Tursiops truncatus*) population was studied in the Cres-Lošinj archipelago (Croatia). The objective of the study was to identify important feeding and nursing grounds in the region. This study presents a quantitative analysis of behavioural patterns in relation to habitat, looking at group composition and behaviour. Data were collected using non-systematic boat surveys from 2005 to 2009. In this period 438 encounters of bottlenose dolphins were recorded applying standard photoidentification techniques. Group size and age of individuals was assessed for each sighting, with particular emphasis on potential mother and calf pairs. The study area was divided into five habitat types defined by bathymetry, bottom variability and anthropogenic activity. Ten behavioural states, defined from previous studies in the region, were stratified in categories related to activities associated with habitat use. Spatial distribution analysis, based on the initial positions of encounters, was carried out through GIS software ArcMap. Average group size varied from 6 to 9 individuals according to habitat use. In areas used for trawl fishery group size was smallest. Age composition did not vary among the habitat types. Overall results indicate the prevalence of feeding-related activities throughout the area (57,01%). Travel was the next largest category (11,34%) which was found to be related to areas of high anthropogenic activity. Over the research period there was a progressive decrease in the observation of mother-calf groups suggesting that this region is losing its importance as a nursing ground. However, the area is consistently used as a feeding ground. The implications of these findings are that the anthropogenic disturbance from expanding tourism is likely to be the causal factor for the change in habitat use in the region.

Poster code : CONS-19

Human exploitation and shifting ecological roles of the South American sea lion (*Otaria byronia*) in the southwestern Atlantic since the middle Holocence

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South American sea lions (*Otaria byronia*) have shifted diet to adapt to the new environmental conditions created by industrial fishing. Nevertheless, population size has been proposed to be the major determinant of diet composition, as they consume primarily large demersal preys when and where the population is small and shift to smaller benthic and pelagic prey when and where the populaltion increases. In this study, widespread availability of archaeological and moderns samples allowed us to reconstruct the diet of sea lions in different periods and infer the impact of Paelo-Indian exploitation on population size. We examined the stable isotope ratios of C and N in the bones of sea lion from northern-central and southern Patagonia Argentina. Additionally, ancient and modern shells of intertidal mollusks were analysed to explore changes in the isotope baseline and allow comparison between bone samples from different periods. Stable isotope ratios show that pelagic fish were the major prey of sea lions inhabiting northern Patagonia 3000-2000 years ago, but diet relied more heavily on demersal fish following the intensification of sea lion exploitation by Paleo-Indians (1000 to 350 years ago). In contrast, stable isotope ratios from the bones of sea lions inhabiting southern Patagonia during the second half of the Holocen indicate a rather stable diet and suggest no major impacts on sea lions population resulting from Paleo-Indian exploitation. High δ15N values in modern sea lions from both areas indicate the consumption of large prey with a high trophic level, likely associated to an increase in sea lion body size as a consequence of a phenotypic response to reductions in population density. These results underscore the potential for overexploitation-induced changes to sea lion trophic original role, even when these animals can persist in highly fragmented ecosystems, as a result of their high trophic plasticity.

Poster code : ANA-PATH-24

Cerebral Toxoplasmosis in Atlantic spotted dolphin sranded in Canary Islands

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Toxoplasma gondii is a parasitic protozoan species belonging to the Family Sarcocystidae. The life cicle of T.gondii has two phases; a sexual phase, which take placein a definitive host (members of the family Felidae); and an asexual phase, in the intermediate hosts (any warm-blooded animal, including several species of marine mammals). It has been considered a potential cause of mortality in many species of domestic and wild animals, including the cetaceans species. The present study is focused on 85 Atlantic spotted dolphins (*Stenella frontalis*) stranded along the coast of the Canary Islands, from 2000 to 2013. A complete necropsy was performed on 60 specimens with a very fresh to moderate autolysis conservation status. During necropsy, selected samples were collected and fixed in 10% neutral buffered formalin, routinely processed and stained with hematoxylin and eosin for histopathological studies. Histology revealed the presence of granulomatous inflammation and necrotizing encephalitis associated to tachyzoites and tissue cysts[PMF1] . T. gondii was detected immunohistochemically by using a polyclonal antiserum (anti-*T.gondii*). As a result, 8 out of 60 (13,3) cetaceans presented *T. gondii* protozoan. We are conducting further studies to investigate other possible concomitants pathologies in these animals.

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