The MEOP data portal
When diving animals help us to observe the oceans

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A typical day at sea for an elephant seal

Mean Diving Depth: 450 m (max 2000 m)

Mean Diving Duration: 21 mn (max 90 min)

Mean Surface Interval: 3 mn

60 dives per day
CTD-Satellite Relay Data Logger

Lifetime: 
~ 11 months

Resolution: 
17-20 depths 
4 profiles/day

Accuracy: 
T = 5mK 
S = <0.05 
P = 2dbar

Boehme et al. (2009)
Roquet et al., 2014

Accuracy after calibration: better than 0.03ºC and 0.05 psu

Deployment on land

CTD Profiling
Data compression

ARGOS transmission
Geo-localization

Reception in CLS Argos, Toulouse

DMQC
Data portal: meop.net

Distribution to ocean data centers

Post-processing of CTD data

Data extraction
Storage at SMRU
Distribution to GTS

Salinity adjustment for tag ct78d-D358-11:

\[ S_{adj} = S_{raw} - 6 \times 10^{-5} \times P - 0.12 \]
Kerguelen Islands
552 profiles
6 months of data

2-3 profiles /day
20 datapoints /profiles
MEOP-CTD database

Database is used:
- to investigate the behaviour and well-being of marine animals.
- to deliver data to study the ocean itself.

World map showing the distribution of CTD profiles (i.e. vertical profiles of temperature and salinity) collected since 2004 currently available in the MEOP-CTD database.
Great complementarity with other sources of data

Main contributor south of 60S
MEOP data portal: meop.net

- MEOP: Marine Mammals Exploring the Oceans Pole to Pole

- The MEOP data portal launched in June 2015: meop.net

- Data available in:
  - netCDF (Argo-type)
  - ODV ASCII (original levels)
  - ODV ASCII (interpolated)

- Contact: info@meop.net
List of users (non exhaustive)

Availability of the MEOP-CTD database in data centres:
• Coriolis CORA
• BODC
• NODC World Ocean Database
• IMOS

Other notable users:
• Referenced in the INSU marine databases
• SOSE (Southern Ocean State Estimate)
• Ocean Data View
• OBIS Data Manager at IOC-UNESCO
• Southern Ocean Observing System
More than just physics

• Tags deliver behavioural and biological data!
  – Dive profiles (from pressure data)
  – Prey catch events and fat condition (from accelerometry)
  – Detailed tracking (GPS Fastloc)

• Tagging studies are driven by biological questions
  – Habitat preference
  – Competition (other species, fisheries)
  – Impact of renewable energies
  – Conservation

• Other sensors and many designs:
  – Fluorometer
  – Oxygen
  – Light
New EuroGOOS Task Team

- Help to consolidate international data infrastructure and delivery within EuroGOOS.
- Provide advice on oceanographic animal-borne sensor data
  - Calibration, DMQC, meta data
  - Tagging procedures
  - Scientific support
- Link into EU structures (e.g. EMODnet, Copernicus)
- Link to other groups:
  - MEOP consortium
  - Animal Tracking Network in US
  - Arctic Regional Ocean Observing System
- Support of national proposals as they are part of bigger picture (seals cross boundaries).
EU community (MEOP+)

Greenland
- Greenland Institute of Natural Resources (Heide-Jørgensen, Rosing Asvid)
- Aarhus (Teilmann)

UK
- SMRU (Boehme, Fedak, McConnell)
- Aberdeen (Thompson)

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Norway
- Norwegian Polar Institute (Kovacs, Lydersen)
- Bergen (Haug)

Sweden
- Stockholm (Roquet)

Estonia
- Jussi

Denmark
- Aarhus (Teilmann)

France
- La Rochelle (Vincent)
- CEBC-CNRS (Guinet)

Germany
- AWI (Bornemann)

Netherlands
- IMARES (Brasseur)
EU shelf seals (UK)

Grey Seals
1991-2013
n=259

Harbour Seals
2003-13
n=277

Jones et al. (2015)
EU shelf seals (Netherlands)

Grey Seals
2007-2015
n=83

Harbour Seals
2007-15
n=219

Sophie Brasseur & Geert Aarts
EU shelf seals (Baltic)

Recent pilot deployment of CTD/GSM tags on grey seals in the Baltic

Fabien Roquet and Olle Karlsson