

Full Proposals for International Polar Year 2007-2008 Activities

Proposed IPY Activity Details

1.0 PROPOSER INFORMATION

(Activity ID No: 153)

1.1 Title of Activity

Marine Mammal Exploration of the Oceans Pole to Pole

1.2 Short Form Title of Proposed Activity

MEOP

1.3 Activity Leader Details

Kit M. Kovacs
Norwegian Polar Institute
Norway

1.4 Lead International Organisation(s) (if applicable)

Relevant to CCAMLR, ACIA, ICES, IUCN

1.5 Other Countries involved in the activity

United Kingdom
Canada
France
USA
Australia
Greenland
South Africa
Brazil

1.6 Expression of Intent ID #'s brought together in this proposed activity

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1.7 Location of Field Activities

Bipolar

1.8 Which IPY themes are addressed

1. Current state of the environment
2. Change in the polar regions
4. Exploring new frontiers
5. The polar regions as vantage points
6. The human dimension in polar regions

1.9 What is the main IPY target addressed by this activity

1. Natural or social science
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2.0 SUMMARY OF THE ACTIVITY

Marine Mammal Exploration of the Oceans Pole to Pole (MEOP) will deploy state-of-the-art animal-borne CTD tags on strategically chosen, deep-diving marine mammal species to explore their movement patterns, behaviour and habitat utilization in Polar Regions. Concomitant with the ecological data regarding these top predators, a vast, high-precision oceanographic data set will be collected covering logistically difficult areas of ocean in Polar Seas at the fringes of the North and South Atlantic and the South Pacific that are strategically important to climate and ocean modelling. The cross-disciplinary merging of classical oceanography and marine mammal ecology will significantly advance our understanding of the world's oceans and top predators that live in them.

MEOP partners will deploy CTD-tags on beluga whales (*Delphinapterus leucas*), hooded seals (*Cystophora cristata*), Weddell seals (*Leptonychotes weddellii*), crabeater seals (*Lobodon carcinophaga*) and southern elephant seals (*Mirounga leonina*). Most of these species are very deep divers, with maximum dive depths that exceed 1000 m. Virtually all marine mammals forage in oceanic "hot-spots" where productivity is high, which also coincide with human fisheries efforts and areas of high oceanographic interest. Our target species inhabit areas with significant seasonal ice-cover in both the Arctic and the Antarctic, the edges of which are of particular interest to oceanographers in terms of deep-water formation. Ice-filled waters are rarely sampled by standard oceanographic studies using ships or other methodologies especially over extended times because of logistical and cost constraints, but they are routinely visited by these polar marine mammals. MEOP's oceanographic data will also enhance our ability to accurately model currents and deal with basin scale models.

IPY affords a unique opportunity to collect novel data sets from relatively little-known polar marine mammal species simultaneously with dedicated oceanographic cruises sampling along systematic grids using traditional ship-based CTD technology. Co-operation between biological and oceanographic programmes within IPY will provide MEOP with comprehensive, synoptic oceanographic coverage that will provide a unique opportunity to quantify factors determining habitat selection and use by key polar marine mammal species. The oceanographic data collected in MEOP will, in turn, provide otherwise unobtainable oceanographic data sets collected at natural hot-spots of productivity, as input data to physically-oriented modelling projects (e.g. the Bipolar Atlantic Thermohaline Circulation Programme, Transport through gaps across the Kerguelen Plateau and inter-basin exchange).

This study is especially timely given the predictions for ecosystem changes in both Arctic and Antarctic systems within the coming decades due to climate change, in addition to increasing fisheries and tourism activities in both the Arctic and Antarctic.

2.1 What is the evidence of inter-disciplinarity in this activity?

MEOP will depend heavily on interdisciplinary co-operation to fulfil its primary objective of defining the characteristics of marine mammal habitats in polar regions. Oceanographers and biologists have been working together closely right from the initial design phase for the animal-borne tags. Scientists from both disciplines published the first marine mammal-CTD paper together. This tight collaboration between scientists within these fields is at the heart of MEOP. We also hope to expand beyond this exciting, young collaboration into more complex ocean and climate modelling questions and hypotheses with the data base that will be produced in MEOP and within the broader IPY community. Our project team (see below) is well balanced with 50/50 physical and biological scientists.

2.2 What will be the significant advances/developments from this activity? What will be the major deliverables? What are the outputs for your peers?

MEOP will provide a great deal of novel at-sea data regarding the movements, behaviour and habitat utilization of marine mammals in the polar regions. All of this material will be published in high-quality scientific journals.

MEOP will also provide a vast oceanographic data set from logistically difficult areas in polar regions for the oceanographic community.

MEOP will also provide data useful for the construction of management and conservation plans. CCAMLR, ACIA, ICES and IUCN will all have an interest in the output of MEOP in addition to the marine mammal science community and the general public.

2.3 Outline the geographical location(s) for the proposed field work (approximate coordinates will be helpful if possible)

Locations	Coordinates
Kerguelen Is. (& Dumont Durville)	49 35 S 70 26 E
Livingston Is.	62 28 S 60 46 E
Marion Is.	46 54 S 37 51 E
Macquarie Is.	54 30 S 158 57 E
Bouvetøya	54 26 S 3 24 E
South Georgia (& Signy Is.)	58 30 S 35 30 E
Elephant Island	61 20 S 55 30 W
Hudson Bay & Ice (Front/Gulf & West)	58 90 N 68 27 E & 71 00 N 8 17 W

2.4 Define the approximate timeframe(s) for proposed field activities?

Arctic Fieldwork time frame(s)	Antarctic Fieldwork time frame(s)
03/07 - 04/07	10/07 - 02/08
08/07 - 09/07	09/08 - 02/09
03/08 - 04/08	MM/YY - MM/YY

2.5 What major logistic support/facilities will be required for this project?

Ice strengthened research ship
Helicopters
Existing field stations

Further details – Most field sites can be visited by regular ice-reinforced ship transport – but Bouvetøya requires a helicopter landing. Additionally, helicopter transport is required for the hooded seal work planned for both the east and west North Atlantic (Canada and Norway).

2.6 How will the required logistics be supplied? Have operators been approached?

Source of logistic support	Likely potential sources	Support agreed
Consortium of national polar operators	Y	
Own national polar operator	Y	
Another national polar operator	Y	
National agency	Y	
Military support	Y	
Commercial operator	Y	
Own support	Y	
Other		

2.7 If working in the Arctic regions, has there been contact with local indigenous groups or relevant authorities regarding access?

Yes – the beluga work will be done in close co-operation with indigenous people of Nunavik – via the Nunavik Research Centre and the NW Atlantic hooded seal work will be done in

partnership with the Greenland Nature Institute which has close ties to the Greenlandic aboriginal community. None of our other field sites occur in areas where indigenous groups reside.

3.0 STRUCTURE OF THE ACTIVITY

3.1 Origin of the activity

This is a new activity developed for the IPY period

3.2 How will the activity be organised and managed? Describe the proposed management structure and means for coordinating across the cluster

The activities of MEOP will be coordinated by a Joint Steering Committee with all project element leaders (PIs) serving on the committee. All PIs will be responsible for maintaining regular contact with linked-projects within the broader IPY-community that are lead by a scientist within their nation and informing MEOP participants of developments. A schedule of routine electronic contact will be established and all participants will be able to view one another's incoming data on a daily basis; we will have annual meetings in person.

The Norwegian Polar Institute will host the web site and lead and facilitate contact within the MEOP consortium. The web site will be routinely updated and will serve both as a means to communicate effectively with other IPY projects and the public. Education packages aimed at secondary school students will be placed on the web page and near-real-time tracking of selected animals will be featured.

3.3 Will the activity leave a legacy of infrastructure and if so in what form?

MEOP does not require new infrastructure and hence will not leave a legacy in this form. However, advances in the technology regarding animal-borne sensors will undoubtedly occur with the new generation of improved tags and this will be a technological legacy.

3.4 Will the activity involve nations other than traditional polar nations? How will this be addressed?

Currently, all MEOP participants are countries that have Arctic or Antarctic programmes; in fact many have bipolar interests. However, MEOP will gladly facilitate non-traditional nation's logistics (& other) needs where ever possible within the programme. For example a Malaysian, Antarctic programme is discussing potential linkage with Norwegian Antarctic logistical support.

3.5 Will this activity be linked with other IPY core activities? If yes please specify

MEOP is a natural partner for a wide variety of IPY initiatives. Projects ID#23 (full proposal), 64, 83, 173, and 397 are likely to be tightly associated and are already in contact with us. Additionally, projects 18, 20, 63, 80, 114, 180, 200, 305, 320, 343, 365, 403, 405, 417, 485, 573, 688, 713, and 821 have objectives and interests that overlap with MEOP and there is potential for data sharing and other forms of collaboration (all projects have been contacted via their lead by MEOP). Additionally, all IPY projects involving marine mammals are of natural link to MEOP via our shared Society affiliation, professional interests and familiarity and shared literature base and thus projects 236, 640, 663, and 780 will undoubtedly form a network with MEOP as well. These projects have also been contacted. Some MEOP partners are also involved directly in some of these other initiatives.

3.6 How will the activity manage its data? Is there a viable plan and which data management organisations/structures will be involved?

Data from MEOP will be managed in accordance with the rules of access and use of the IPY Data Policy. The oceanographic data will form a unique, vast multinational dataset that will be of value to many IPY projects.

We have not finalized our choice for permanently archiving the data as yet for international access – but this will become clear when IPY projects become more concrete.

A meta database will be available on MEOP's homepage from the onset of data collection and throughout the project period.

3.7 Data Policy Agreement

Will this activity sign up to the IPY draft Data Policy (see website)

Yes

3.8 How will the activity contribute to developing the next generation of polar scientists, logisticians, etc.?

Contributions will be made by MEOP via -

1. post-doctoral and graduate student research training that will include international exchange among MEOP laboratories and field sites
2. secondary school education packages
3. media contact and public education (especially via the website)
4. the 6 female scientists –including the project leader – engaged in MEOP will serve as role models to young women hoping to establish polar science careers

3.9 How will this activity address education, outreach and communication issues outlined in the Framework document?

Education, outreach and communication will be a specific focus for the Steering Group.

MEOP will -

Utilise the press and public relations departments of the institutes within the Consortium in order to broadly disseminate knowledge gained during the programme.

A central webpage will be established that will introduce the project and participants as well as making information regarding progress in the project available in a timely manner – including tracking individual animals of each species in near-real time.

General information will be given on data base access, news from workshops and the status of publications. Popular summaries of the science produced will be an important part of our outreach.

During the field campaigns reports will be placed on the webpage to inform participating research groups as well as the public about progress during this very stimulating phase of activity. The webpage will be updated regularly.

Lectures at conferences as well as public lectures and the production of popular scientific articles in relevant magazines (or other forums) will ensure that discoveries made by MEOP will be broadly disseminated.

Marine mammals are very popular subjects with the public and thus it is relatively easy for our field to access the public eye (& ear).

3.10 What are the proposed sources of funding for this activity?

Funding for individual projects components will be sought from National Research Councils as well as Arctic and Antarctic programmes within the participating nations.

3.11 Additional Comments

MEOP has strong potential to be an "IPY favourite" with the public. Marine mammals are viewed in most countries as being "special" animals that are very appealing to people. They can serve as polar ambassadors that highlight -- the need for good ecosystems management, wise fisheries practices, good toxicology legislation, the risk of climate change impacts, and the need for broad understanding of whole ocean systems.

4.0 CONSORTIUM INFORMATION

4.1 Contact Details

Lead Contact

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4.2 Other significant consortium members and their affiliation

Name	Organisation	Country
Dr. Mike Hammill (PI)	Department of Fisheries and Oceans	Canada
Prof. Dan Costa (PI)	University of California, Santa Cruz	USA
Prof. Marthan Bester (PI)	University of Pretoria	South Africa
Prof. Mark Hindell (PI)	University of Tasmania	Australia
Dr. Christophe Guinet (PI)	CEBC-CNRS	France
Dr. Monica Muelbert (PI)	Federal University of Rio Grande	Brazil
Dr. Christian Lydersen	Norwegian Polar Institute	Norway
Dr. Tore Haug	Marine Research Institute	Norway
Dr. Ole Anders Nøst	Norwegian Polar Institute	Norway
Dr. Bill Doidge	Nunavik Research Center	Canada
Dr. Gary Stenson	Department of Fisheries and Oceans	Canada
Dr. Aqalu Rsing-Asvid	Greenland Nature Institute	Greenland
Dr. Isabelle Ansorge	University of Cape Town	South Africa
Dr. William Froneman	Rhodes University, Grahamstown	South Africa
Dr. Fraser Davidson	Department of Fisheries and Oceans	Canada
Dr. Eileen Hofman	Old Dominion University, Norfolk Virginia	USA
Dr. John Klinck	Old Dominion University, Norfolk Virginia	USA
Dr. Steve Rintoul	CSIRO	Australia
Dr. Nathan Bindhoff	University of Tasmania	Australia
Dr. Marie Noel Houssey	LOCEAN- University of Paris VI	France

Dr. Christine Porvost	LOCEAN- University of Paris VI	France
Dr. Mike Meredith	British Antarctic Survey	United Kingdom
Dr. Martin Biuw	Sea Mammal Research Unit	United Kingdom