Full Proposals for International Polar Year 2007-2008 Activities

Proposed IPY Activity Details

1.0 PROPOSER INFORMATION

(Activity ID No: 26)

1.1 Title of Activity
The Pan Arctic cluster for Climate forcing of the Arctic Marine Ecosystem

1.2 Short Form Title of Proposed Activity
PAN-AME

1.3 Activity Leader Details
Stig Falk-Petersen
Norwegian Polar Institute
Norway

1.4 Lead International Organisation(s) (if applicable)
NULL
NULL
NULL
NULL

1.5 Other Countries involved in the activity
Canada
Norway
USA
Sweden
Japan
China
Russia
Germany
Denmark
Greenland
Korea
Netherlands
Finland
Poland
France
Scotland, Uk

1.6 Expression of Intent ID #'s brought together in this proposed activity
29, 47, 50, 58, 120, 245, 247, 280, 307, 329, 363, 537, 545, 562, 602, 663, 673, 681, 687, 712, 752, 902,

1.7 Location of Field Activities
Arctic

1.8 Which IPY themes are addressed
1. Current state of the environment
2. Change in the polar regions
3. Polar-global linkages/tele-connections
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

2.0 SUMMARY OF THE ACTIVITY

Rationale-The extent and thickness of Arctic sea ice vary considerably from year to year and over decadal time scales. Assessing the processes of oceanic and atmospheric forcing on this ice cover is critically important in understanding the response of the Arctic marine ecosystem to climate variability and change. Security of food sources is a key element in this change as is the stability of traditional lifestyles, sustainable exploitation of new resources and education of the next generation of Arctic Scientists. The present variability in sea ice cover on Arctic marine ecosystems and regional climate requires a substantial improvement in our understanding of the links between freshwater and sea ice, sea ice and climate, and sea ice and biogeochemical fluxes. The need for data is particularly strong for the shallow coastal shelf regions (30% of the Arctic basin), the shelf-basin interface and within the marginal ice zones and polynyas of the Arctic.The environmental, socio-economic and geopolitical consequences of an eventual sustained reduction of Arctic sea ice are bound to be tremendous: marine Arctic ecosystems will be displaced, a new ocean will open to exploitation, climate warming may accelerate, global ocean circulation may be modified, and traditional use will change. Given our Arctic responsibilities the PAN-AME cluster is an essential element in the international efforts to understand the current a near future changes on the physical-biological coupling within the Arctic marine ecosystem.
Science – The PANA-AME cluster will focus on testable hypotheses integrated across several research projects in a coordinate effort to examine the role of that changing oceanic and atmospheric forcing have o the Arctic marine ecosystem. Space limits the presentation of these but we illustrate with these core questions to be addressed: What is the role of hydrologic, oceanographic and meteorological processes in ice growth, decay and transport in each of the cluster regions of interest (ROI) and what is the large scale context within which they are embedded? What are the hydrodynamic (including ice and snow cover dynamics) control of Arctic shelf photosynthetic production and its export to the benthos and the pelagic food web. What is the flux of carbon associated with these processes and how does this change in our various ROI? What is the potential impact of increased UV radiation on biological productivity? What is the role of microheterotrophs and mesozooplankton in transforming autochthonous and allochthonous particulate and dissolved matter? What are the trophic linagkages in various ROI within our cluster how is energy transfer between trophic levels affected by changes inn the physical system? How are contaminants linked to changes in the physical and biological systems and what is the nature of source, sink and transport these elements? Detailed physical and biological measurements will be used to constrain and calibrate physical models of ocean-sea ice-atm0sphere atmosphere coupling and biophysical models of ecosystem function and carbon flows within the IPY-AME regions of interest. Field work will focus on significant time scales pertinent to each of our ROI with ranges from weekly to interannually. Observatories will be a key element in the cluster with installation within the IPY timeframe and continuation of these observatories as a legacy of the IPY.
Benefits – This cluster marshals the majority of existing international expertise in Arctic marine ecosystem research. It also marshals involvement of circumarctic aboriginal peoples through involvement in individual ROIs. By clustering we agree to integrate our geographically separate projects into a coordinated pan-Arctic IPY program through standardization of sampling methods, coordination of people, resources, and access to a wealth of existing arctic logistics

(field stations, ice camps, ships, aircraft). We agree to archive a coordinated data repository which will remain as a legacy of this project. We also intend to share data amongst science teams working in different ROIs as a means of assessing marine ecosystem response to pan-arctic climate variability and change.

2.1 What is the evidence of inter-disciplinarity in this activity?
This cluster will study everything from viruses to whales in the marine ecosystem, everything from the bottom of the ocean to the top of the atmosphere in the physical system, and it will integrate social science research through the integration of stakeholders (northern peoples, northern industry, northern policy development) into the research process.

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?
Outputs from these interdisciplinary teams will be specific to address regional concerns such as ecosystem function, sensitivity to physical forcing, management of key species (e.g., whales, seals, char, cod). When integrated under the IPY-AME these core projects will provide a very unique view of the Pan-Arctic marine ecosystem and the varying response of different geographic regions to similar hemispheric forcing. Process studies will be a key element within the cluster with outputs being used to establish more effective models of processes operating both in the physical and biological realms, and more importantly development of truly coupled physical-biological models which will be required to manage Arctic change into the future. We also intend to supplement our process studies with the installation of observatories around the circum-arctic region. Some of this work has already begun and we hope to supplement it with the IPY-AME objectives. Outreach will be an integral part of our program with focus both on regional and international programs which highlight this existing interdisciplinary science and exploration (an element for which we already have considerable collective expertise). A core aim of our cluster is to elevate our existing national programs into a truly international and pan-Arctic focused initiative which can leave a lasting legacy in issues pertaining to the Arctic marine ecosystem.

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

Locations	Coordindates
Southern Beaufort Sea	
Barents Sea	
Norwegian and East Greenland Seas	
Baffin Bay	
Laptev Sea	
Kara Sea	
Bering Sea	
Chukchi Sea and the Arctic Ocean	

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

Arctic Fieldwork time frame(s)	Antarctic Fieldwork time frame(s)
05/06 -	

2.5 What major logistic support/facilities will be required for this project?
Icebreaker
Fixed wing transport aircraft
Ice strengthened research ship
Existing field stations
Ship recovery of buoys etc
Observatories

Autonomous Underwater Vehicle
Fixed wing geophysical aircraft

Further details – the cluster members have access to significant expertise working in the pan-arctic region and we have access to significant logistical resources required for this type of work.

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		
Own national polar operator	Y	
Another national polar operator	Y	
National agency	Y	
Military support		
Commercial operator	Y	
Own support	Y	
Other	Y	

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

3.0 STRUCTURE OF THE ACTIVITY

3.1 Origin of the activity
This activity is the start of a new programme that will outlive IPY

If part of an existing programme please name the programme – The cluster have several ongoing programmes

3.2 How will the activity be organised and managed? Describe the proposed management structure and means for coordinating across the cluster
The project will be coordinated by the Norwegian Polar Institute through the ARCTOS network (http://www.nfh.uit.no/arctos/). The overall project coordinators will be headed by Stig Falk-Petersen Norwegain Polar Institute / ARCTOS together with Dave Barber (ArcticNet), Graham Shimmield (SAMS). ARCTOS is an ongoing organisation with a strong co-operation with all the involved partners. A steering committee will be appointed.

3.3 Will the activity leave a legacy of infrastructure and if so in what form?
Yes, the cluster has today national and international research projects lasting through the IPY periods.
-development of infrastructure to carry out integrated ecosystem science at participating laboratories – notably at the new Arctic Marine Laboratory Svalbard, at Daneborg, Disco Bay research Station Greenland, at Barrow, Alaska and in the Canadian Arctic.- development of Pan Arctic Observatories / moorings around Svalbard, Greenland,Hudson Bay, Baffin Bay, Beaufort Sea, Laptev Sea and Barents Sea- expansion of education and post-educational training opportunities in polar ecosystem science

3.4 Will the activity involve nations other than traditional polar nations? How will this be addressed?
Only active polar nations are member of this cluster so far

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

Yes - Interpretation of historical data series of climate variables for developing regional forcing functions that will be used for model validations performed on multiple time and space scales.
-Contemporary data series of biological variables for the Arctic and appropriate for use in coupled biological-physical model validation studies, ecosystem models, scenario models and contaminant bioaccumulation models and effects studies over multiple scales of biological organisation.
-New quantitative relationships on biological responses to climate-driven physical forcing mechanisms in the European Arctic.
-Establishment of new education and training opportunities for students and young scientists in polar ecosystem science.
The PAN-AME cluster will also work closely with ECOGREEN-cluster . PAN-AME and ECOGREEN (IPY 773) will together make a Pan Arctic Observatory-, Marine Laboratory- and Ecosystem network.

3.6 How will the activity manage its data? Is there a viable plan and which data management organisations/structures will be involved?
All the involved institutes have a well developed data management system, linked to national and international data banks (i.e. ICES)

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.?
The large Pan Arctic activity by this cluster will be one of the main arenas for developing the next generation of polar scientists, engineers and logisticians. PAN AME already has a PhD school and a clear plan to offernartists and community members the possibility to develop their profession and interests. See http://www.nfh.uit.no/arctos/ and http://www.arcticnet-ulaval.ca

3.9 How will this activity address education, outreach and communication issues outlined in the Framework document?
The students will be enrolled in the ARCTOS (http://www.nfh.uit.no/arctos/) and ArcticNet (http://www.arcticnet-ulaval.ca) student network and the ongoing ARCTOS PhD trainee shool. The ARCTOS PhD trainee school enrolls 5 – 10 students a year and the student workshops are open for up to 30 students from the extended network of national and international collaborators. Further dedicated courses will be offered through UNIS (University Centre in Svalbard, http://www.unis.no). Further, new education activities will be developed between the partners, including field courses offered the University of the Arctic. The outreach activity will build on the ongoing activity to ARCTOS, ArcticNet and AWI (http://www.awi-bremerhaven.de).

3.10 What are the proposed sources of funding for this activity?
Funding is already in place from the involved Institutions, national programmes and EU. Further funding will be applied for.

3.11 Additional Comments
In addition 2 project with no available ID no will be part of the cluster.
OSCAR, Overwintering strategies in Arctic fjord community: importance in the definition of the seasonality of growth, reproduction and recruitment. Dr. Patrick Mayzaud, Laboratoire d'Océanographie Biologique (LOV)
ARC-TIME, Arctic time-series program, physical and chemical forcing of ecosystem structure. Jørgen Berge UNIS

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
Graham Shimmield, Ray Leakey	1. Scottish Association for Marine Science, SAMS	Scotland, Uk
Soren Rysgaard	Greenland Institute of Natural Resources	2. Greenland Institute of Natural Resources, (Søren Rysgaard) Greenla
Gerhard Kattner, Jens Hoelemann	3. Alfred Wegener Institut für Polar- und Meeresforschung (AWI),	Germany
Michael Greenacre	Universitat Pompeu Fabra	Spain
Slawek Kwasniewski	Institute of Oceanology, Polish Academy of Sciences	Poland
Partck Mayzaud	6. Laboratoire d'Oceanographie de Villefranche (LOV), CNRS, University VI Paris	France
Guido di Prisco	Polarnet IBP	Italy
Louis Forteir	5. ArticNet, Departement de biologie, Université Laval, Quebec	Canada
Paul Wassmann	Norwegian College of Fishery Sciences, University of Tromso	Norway
Egil Sakshaug	Trondhjem Biological Station, NTNU	Norwy
Dag Slagstad	SINTEF, Trondheim	Norway
Dag Hessen	Biological Institute, Oslo University	Norway
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Kunio Shirasawa, Sei-Ichi Saitoh	Hokkaido University	Japan
Hajo Eicken, Rolf Gradinger	University of Alaska Fairbanks	USA
JoLynn Carroll	Akvaplan-niva	Norway
Lasse Lonnum, Jorgen Berge	The University Centre in Svalbard (UNIS),	Norway
Henning Bauch / Heidemarie Kassens	Leibniz Institute for Marine Sciences at Kiel University (IFM-GEOMAR)	Germany
Vladimir Troyan	State University of St. Petersburg (SpbU)	Russia
Leonid Bobylev	14. Nansen International Environmental and Remote Sensing Center (NIERSC)	Russia
Sergey Priamikov / Leonid Timokhov	13. State Scientific Center of the Russian Federation the Arctic and Antrarctic Research Institute (AARI)	Russia
Igor Dmitrenko	IARC	USA