

Full Proposals for International Polar Year 2007-2008 Activities

Proposed IPY Activity Details

1.0 PROPOSER INFORMATION

(Activity ID No: 38)

1.1 Title of Activity

Ocean-Atmosphere-Sea Ice-Snowpack Interactions affecting Atmospheric Biogeochemistry and Ecosystems in the Arctic

1.2 Short Form Title of Proposed Activity

OASIS - IPY

1.3 Activity Leader Details

Harry Beine
C.N.R. - IIA, Monterotondo Scalo (Roma)
Italy

1.4 Lead International Organisation(s) (if applicable)

IGAC
SOLAS
AMAP
SCOR (in process of application)

1.5 Other Countries involved in the activity

USA
Canada
France
Germany
China
Denmark
Finland
Greece
Japan
New Zealand
Norway
Poland
Russia
Sweden
Switzerland
UK

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

344, 147, 308, 321, 323, 537, 574, 695, 698, 699, 976

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
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

OASIS is an international multi-disciplinary effort to study Ocean-Atmosphere-Sea Ice-Snowpack Interactions in the Arctic. The specific focus is to develop a quantitative understanding of the processes that are involved in Air-Surface Interactions and chemical exchange between the title reservoirs. As the nature and extent of snow and ice cover is changing, OASIS will assess the associated impact on, and by, climate change, and the human and ecosystem impacts of air-surface exchanges of chemical species.

OASIS will quantify the impact of chemical, physical and biological exchange processes on tropospheric chemistry, the cryosphere, and the marine environment, and their feedback mechanisms in the context of a changing climate. OASIS has identified studies in the Arctic Ocean surface environment as a key programmatic component to reach these goals. IPY represents a unique opportunity to develop new initiatives that enable the community to do the best science, made possible by an international approach to logistics and experimentation. A legacy will be development and evaluation of new tools, implemented through a network of complex logistics, e.g. involving icebreakers, ice camps, piloted and unmanned vehicles in the atmosphere and ocean, satellite remote sensing, and computer models, to address the pressing scientific issues.

The OASIS program was established in 2003, and has developed an internationally vetted Science Plan, and an Implementation Plan, available at www.OASISHome.net. A growing number of individual projects are contributing to the scientific goals since winter 2004/05 (to date 45 individual projects, see 3.11 below). OASIS is linked to a number of international organizations and activities, including AMAP (the Arctic Monitoring and Assessment Program), and the IGBP (International Geosphere – Biosphere) programs IGAC (International Global Atmospheric Chemistry) under the AICI (Air Ice Chemical Interactions) activity, and SOLAS (Surface Ocean Lower Atmosphere Study).

During IPY (2007 – 2009), we propose to:

1. Conduct coordinated icebreaker, ice camp, and aircraft studies of OASIS chemical exchange.

A principal focus will be a nine-month coordinated campaign from the frozen-in icebreaker ‘m/v Antarctica’ and connected ice camps. Measurements will be made of a wide variety of chemical and biological compounds and physical properties in the Arctic marine boundary layer atmosphere, cryosphere and ocean. The impact on, and by, the physical state of the local environment will be a key topic of these studies. Shorter ice breaker campaigns (e.g. involving the Canadian “Amundsen” and the Russian ice-enforced RV "Akademik Feodorov", and "Mikhail Somov”) are also envisaged. This and connected aircraft work will be coordinated with other international IPY efforts.

2. Establish a network of Arctic Ocean buoys that will enable year-round measurements of ozone and related chemical species. This work will fill major gaps in our knowledge of physical/chemical variables involved with Arctic Ocean surface ozone and mercury depletion and radiatively-active trace-gas budgets. The network will evolve in close cooperation with the International Arctic Buoy Project, the North Pole Environmental Observatory, and the proposed Arctic Ocean Observing System.

3. Examine physical and chemical oceanographic variables that influence ocean-atmosphere chemical exchange, by observations of parameters in physical oceanography; marine biology; marine geology; sea ice characteristics; and hydrography using, among other tools, an

autonomous underwater vehicle (AUV) as Below ice Environmental Laboratory.

In addition, not directly related to IPY, OASIS will:

4. Conduct supporting laboratory studies of biological, chemical and physical processes relevant to snow, ice, gas, and aerosol phase photochemistry and chemical exchange.

5. Develop and apply 1D and 3D models of OASIS exchange and associated atmospheric chemistry and cloud physics impacts, in association with scientists involved with 1-3 above.

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

This research effort is expressly interdisciplinary: the science involved necessarily spans all aspects of Polar Studies, e.g. biology, oceanography, atmospheric science, ice physics, human dimensions, hydrology, biogeochemistry and others. It involves methods in satellite remote sensing, instrument development, ocean engineering, sensor networks, and cyber-infrastructure. In evidence of the inter-disciplinarity is a) the participant lists of the science and implementation workshops at Purdue, IN, and Rome, Italy, respectively; b) the nature of already existing OASIS programs such as OOTI, and c) the planned projects detailed in the science plan.

The inter-disciplinarity of the OASIS science and implementation approach is demonstrated in the OASIS cartoons at <http://www.oasishome.net/summary.htm>.

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?

OASIS is about how global change is affecting air surface exchange of chemical species in the Arctic, and associated feedbacks. OASIS starts from the premise that global warming is occurring and that there is a link with a change of climate in the future. In the Arctic, this change is much more pronounced for reasons that are understood; but the feedbacks and implications with respect to atmospheric composition, and inputs of chemical and toxic species are not. OASIS will not attempt to discern actual environmental indicators for change. Rather, OASIS will delineate the physical-chemical processes (mechanisms) that take place in the Arctic at the crucial interface between the atmosphere and the ocean below. These processes are very poorly understood but there can be no doubt that they will have an impact on the nature of climate change, and at the same time they will be influenced significantly by the change in climate. To truly advance this understanding it is crucial to combine knowledge and expertise from many scientific disciplines in atmospheric, oceanographic and cryospheric research. Hence the outcome from OASIS and its legacy can be summarized as follows:

- (a) a new paradigm for Arctic physical research by establishing linkages and understanding of scientific disciplines that are not currently communicating
- (b) advanced understanding of interface processes in the Arctic.
- (c) the initiation of a long term measurement data set (for O₃, CO₂, and BrO) from a grid of O-Buoy sites across the Arctic Ocean surface. Such data will be an essential part of observing, understanding, predicting and preparing for Arctic change in the 21st century.
- (d) new and improved modelling tools for understanding and anticipating future climate change.
- (e) new in-situ measurement capabilities, where required also for (unattended) remote measurements in the remote, hostile, highly sensitive and changing Arctic Environment.
- (f) capability for in ocean and under ice sensing of the water column to assess interaction between above surface and below surface processes.

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

Locations	Coordinates
Arctic Ocean wide chemical/ozone buoy network	90N; 75N/50E; 75N/170E; 75N/150W; 60N/80W, + others
Drifting frozen-in icebreaker m/s Antarctica	Start at 85N/100E
Icebreaker cruise with the Canadian research icebreaker Amundsen	Eastern Canadian Arctic
Russian Arctic: drifting ice station "North Pole"; ice-inforced RV "Akademik Feodorov", "Mikhail Somov"	Russian Arctic
North Pole Environmental Observatory	North Pole

Ice camps, north of Barrow, East Siberian Sea, near FranzJosef land.	
Arctic wide aircraft coverage	
Supporting existing land bases; Ny-Ålesund, Barrow, Alert	

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

Arctic Fieldwork time frame(s)	Antarctic Fieldwork time frame(s)
08/07 – 07/08	
01/07 – 12/08	
01/07 – future	

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

- Icebreaker
- Multi-instrumented platforms
- Fixed wing geophysical aircraft
- Autonomous Underwater Vehicle
- Fixed wing transport aircraft
- Snow terrain vehicles
- Helicopters
- New field station

Further details – The m/v Antarctica icebreaker may take up to 66 scientists. This creates an unsurpassed opportunity for undertaking studies on the frozen ocean. Projects not directly connected to OASIS are invited to make use of this unique facility with the aim of identifying partnerships that are complementary, and lead to synergistic discovery.

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?

3.0 STRUCTURE OF THE ACTIVITY

3.1 Origin of the activity

This is a pulse of activity during 2007-2009 within an existing programme

If part of an existing programme please name the programme – OASIS

3.2 How will the activity be organised and managed? Describe the proposed management

structure and means for coordinating across the cluster

All OASIS activities are coordinated by a coordinating office that was established with funding from the Italian C.N.R. – IIA (Roma) in January 2005.

OASIS is managed by a 8-member Executive Committee (EC) (L. Barrie, WMO (CH); H. Beine (coordinator) C.N.R. – IIA (IT); J. Bottenheim, Environment Canada (CA), F. Dominé, CNRS-LGGE (FR); C. Krembs, U. Washington (US); P. Matrai, Bigelow (US); D. Perovich, USACE-CRREL (US), P. Shepson, Purdue-CCRC (US)).

Large proposals for funding of the overall research structure will be submitted by the executive committee. All individual research and funding efforts are further synchronized by national or thematic contact points, which form the Science Steering Team (SST). The members of the SST communicate directly with the coordinator, and among each other. We have appointed a data manager (M. Holm, NSIDC (US)), who will handle all aspects of data management, coordination and storage.

Coordination of the Arctic field campaign on board the m/v Antarctica is a major effort. OASIS is taking under contract ERS Srl (Environmental Research Services, Italy) to help manage all practical aspects of the field campaign together with the supplier of the ship, ARGO Srl (Italy). Both are communicating with the coordinator. All proposal and fundraising activities will be coordinated through the Purdue Climate Change Research Center (www.purdue.edu/climate) and the coordinator.

OASIS will coordinate activities closely with the clusters POLARCAT (EoI 244) and AICI (EoI 50), which are both part of the IPY cluster structure on “Clouds, Aerosol and Chemical Composition”. Within this cluster the lead projects, together with OASIS, have agreed on regular meetings in order to foster collaboration between the different activities. It is also proposed to have joint workshops and after the main field phase joint publication in journal special sections involving several activities. A first joint scientific special session has been submitted to the AGU fall meeting 2005 in San Francisco (A 24: Air-Surface Exchange in Polar Environments: OASIS-AICI-SOLAS).

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

OASIS will leave a legacy of

- a) A research network of surface ozone/CO₂ chemical buoys: capability to conduct unattended chemical measurements in the Arctic Ocean atmosphere. This network will continue indefinitely beyond the IPY time frame. The aim is to obtain a long term dataset of chemical measurements over the Arctic Ocean essential for future climate and air quality change assessment studies. A major technical hurdle that will be tackled is autonomous, clean, and reliable power generation, to power the buoy sensors for long term unattended operation. This technology will be a critically important asset to all involved in remote operations of any kind in polar regions.
- b) The icebreaker ‘Antarctica’. This ship will be fitted for research needs prior to the field campaign; The Italian National Antarctic Project (PNRA) has tentatively indicated interest in taking over the Antarctica after completion of the OASIS fieldwork to replace their current research vessel (m/v Italica) for Antarctic exploration.
- c) The "MUN Explorer AUV" will be fitted with equipment for under ice operation and the program will provide the operating expertise needed for extended Arctic under ice operations. The AUV will be available for future Arctic missions.

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

This activity involves many nations that are not geographically or politically “polar”, specifically, the UK, France, Germany, Italy, China, Greece, Poland, New Zealand, India, and Japan. This effort will substantially expand those nations’ activities, and raise their level of interest in polar issues.

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

Because of its interdisciplinary nature, OASIS will naturally be linked to several other IPY core activities. Among these:

- (1)OASIS has several natural contacts to the atmospheric communities in the AICI (213) and

ICTC, now POLARCAT (244), and ATMOPOL (318) clusters. Science, fieldwork, data, and special sessions at conferences will be coordinated/shared with AICI; POLARCAT and OASIS plan common fieldwork.

(2)The Arctic Sea Ice cluster (185) has several natural linkages with OASIS.

(3)OASIS has established working relationships with the ocean communities of GEOTRACES (269) and CFL (687). EoI's ATOS (147) and ATMER (321) are part of both OASIS and GEOTRACES.

(4)OASIS is discussing close collaboration with GELATI (267) and CFL (687). It is anticipated that a joined outreach program will be developed

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

OASIS places priority on developing a comprehensive data management plan to ensure that the resources towards conducting experiments and collecting data facilitate the widest research and utility of the data for the broadest benefit.

Because OASIS is an international effort that will be funded by a variety of agencies OASIS recognizes that there may be data management requirements that are unique to specific funding agencies. It is anticipated that the driving force behind data management requirements will be the IPY Committee and OASIS intends to meet IPY requirements, but will also consider additional international requirements and OASIS-specific needs to develop an integrated approach.

A comprehensive data management plan will address the following:

? Establishment of effective means for coordinating data management activities by appointing an OASIS Data Coordinator

? Metadata and documentation standards

? Archival standards

? Data formats

? Data archival

? Data access and user support

The OASIS team will produce documentation identifying IPY data sets along with the characteristics of those data sets, to develop requirements and procedures for ensuring that the data sets are ingested, documented, archived and distributed according to OASIS and IPY specifications. These specifications include ensuring that the metadata are available via a searchable database, and within specifications for free, unrestricted and timely exchange of the data as outlined by the IPY Data Policy.

Documentation detailing OASIS data management requirements will address required metadata and documentation for all data sets collected under the campaign and will be vetted by the OASIS team, and then distributed to all team members. A procedure will be developed to facilitate the collection of metadata and documentation, and ingest of data as appropriate. Participation and commitment by the PI's to this effort will be important to ensure the legacy of the data collected, and every effort will be made to make the process as efficient as possible by creating awareness of requirements before experimentation begins, and efficient means of transferring data and supporting information post-experiment.

Currently organizations and structures which will be involved are the WDC for Glaciology, Boulder, and OASIS will coordinate with other National agencies and IPY Data Management entities as appropriate.

The OASIS program is an ambitious project that fills a gap in understanding of interactions and dynamics in the Arctic, and involves many different disciplines and international partners. As such there are unique challenges to data management, but the strong commitment from the OASIS team to data management that follows international and IPY standards will ensure that the resources to collect data for this program will leave a legacy that will be available for a wide-ranging community of users.

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 International Polar Year presents an extraordinary opportunity to capture the imagination of the general public and students of all ages. We will build on this opportunity to engage the next generation of scientists by entraining undergraduate and graduate students in all aspects of the OASIS program. In particular, students will participate in the field program. They will be paired with senior researchers providing a new perspective on their classroom studies and giving them a chance to experience the Arctic. We plan to involve both senior and junior logisticians in the planning and execution of the year-long drift experiment that is a central element of OASIS. The senior people have the experience and expertise necessary to conduct such a complex operation, while the junior group will acquire the knowledge needed to lead post-IPY activities.

Additionally, education will occur through

- * public education and media opportunities at OASIS sites.

- * international (under)graduate student program geared towards engaging the next generation scientists and educators in northern physical/chemical process. OASIS is working collaborating with GELATI (EoI 267) and CFL (687) to provide teaching opportunities on board of the m/v Antarctica.

- * engagement of Northern communities through community visits (where possible) and bilateral exchange of northern peoples as advisors and wildlife observers aboard the icebreakers.

- * OASIS collaborates with the University of the Arctic (UArctic) and the University Centre on Svalbard (UNIS); e.g. the course "Polar Atmosphere Chemistry" (AGF 340) will be held at UNIS for the first time in November-December 2005. www.unis.no. It will be repeated during IPY 2007-2008 and it is financed the Norwegian Research council and University of the Arctic. The course is arranged and lectured by OASIS scientists.

- * OASIS scientists from NILU and NP will participate in 2-week student cruises arranged by the University Centre on Svalbard (UNIS) in the Fram Strait and the Barentz sea in the autumn and spring seasons of 2006, 2007 and 2008. This is an excellent opportunity for young polar scientists to be involved in cutting edge Arctic fieldwork.

- * OASIS will help organize special sessions on Polar Atmospheric Chemistry at the European Research Course on Atmospheres (ERCA; Grenoble, France) over the coming years.

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

Outreach and education will be a central component of the OASIS-IPY effort. For each field campaign site, we will invite the media to be "embedded" at the station, to have real-time access to the scientific process as it develops. The icebreaker Antarctica represents a unique opportunity for education and outreach. We will invite media participation, including the production of science documentary-type televised media programs, such as the U.S. Nova or Discovery. We will also arrange for involvement of high school and undergraduate level research projects, and teachers, making use of formalized programs, such as NSF's Research Experience for Undergraduates program. We will also produce educational and outreach material through the OASIS Coordinators Office, and the affiliated Purdue Climate Change Research Center (www.purdue.edu/climate).

The O-Buoy project (OASIS project 1009) also represents a unique opportunity for outreach and education. The autonomous buoys will have cameras linked to an Arctic "web-cam" site that will be used for outreach to both K-12 students and teachers, and the general public. A web page that uses this project to highlight atmospheric change in the Arctic region, and how that relates to climate change will be linked to the OASIS program website www.OASIShome.net and will be managed as a contribution from the Purdue Climate Change Research Center. We will also directly involve students of IIsagvik College and Barrow High School in Year 2 of the study when the O-Buoys are technically and scientifically evaluated at Barrow, AK as part of their new technical degree. This effort will also be integrated with other efforts associated with the IPY and beyond, as we plan to continue these measurements in the long term.

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

OASIS is managed by the Executive committee. Individual project components during IPY will be coordinated through a Science Steering Committee. As discussed in the OASIS Science Plan, a major component of OASIS-IPY will involve field studies involving measurements from an

icebreaker, and from associated ice camps. We are currently pursuing funding to secure the Italian icebreaker, the Antarctica. The lease for the Antarctica is expected to be roughly 6M Euro. Fundraising for the Antarctica operational costs will take place through an international consortium of "OASIS Partners". We will solicit commitment of funding, representing 200,000Euro from each partner, either in the form of contribution to OASIS-IPY, or in the form of OASIS Partner costs, to be recovered through organizational fund raising efforts. To date ~30 government agencies, Universities, and Industries have been identified that represent likely OASIS Partners. The process of securing these commitments is underway. There are currently OASIS partner organizations that have launched OASIS fundraising efforts aimed at funding their component of the Antarctica costs. The OASIS Coordinators office will assist each OASIS Partner Organization in developing a funding plan for cost recovery.

Individual experiments will be mounted by PIs operating from the icebreaker, from ice camps, and from coastal sites around the Arctic Ocean. In addition, OASIS scientists will be conducting supporting laboratory studies and working on development of a 3D model of OASIS exchange processes. These efforts will be funded through individual PI grants, or through collaborative research grants to national science funding agencies. The OASIS Science Steering Committee will serve to coordinate linkages between OASIS science team members, in addition to sharing logistics resources, and linking the funding of logistics costs in the internationally collaborative field campaigns. The individual fundraising efforts of OASIS Partner Organizations will be applied to individual projects, as necessary, including securing in-kind contributions of resources, e.g. travel, equipment, facilities, computing resources, etc.

3.11 Additional Comments

List of Individual OASIS Projects

(45 projects as of June 29, 2005; see updated list at www.OASIShome.net)

OASIS - 1001. OASIS/IPY/OOTI (Out On The Ice)

(2004 – 2005, Alert; Barrow (funded); 2006 – 2008, Arctic Ocean (proposed))

J. Bottenheim, R. Staebler, S. Steffen, Environment Canada, Toronto, ON, Canada

J. Whiteway, York University, Toronto, ON, Canada

OASIS - 1002. Oxidation of elemental gaseous mercury in the atmosphere during Mercury Depletion Events (CHIMERPOL)

(II: 2004 – 2007 at Ny-Ålesund (funded); III: 2007 – 2008 Arctic Ocean)

C. Ferrari, LGGE, Grenoble, France

Collaborations:

S. Lindberg, Oak Ridge National Laboratory, Oak Ridge, TN, USA

R. Ebinghaus, GKSS Forschungszentrum Geesthacht GmbH, Geesthacht, Germany

H. Skov, National Environmental Research Institute, Roskilde, Denmark

S. Steffen, Environment Canada, Toronto, ON, Canada

C. Barbante, University of Venice, Venice, Italy

T. Berg, NILU, Kjeller, Norway

OASIS - 1003. Collaborative Research on Snow and Ice Processes in the Deposition and Fate of Mercury in the Arctic (SNACS)

(2004 – 2007, funded)

M. Sturm, USACE-CRREL, Hanover, NH, USA

B. Simpson, U. Alaska Fairbanks, Fairbanks, AK, USA

D. Perovich, USACE-CRREL, Hanover, NH, USA

T. Douglas, CRREL, Fairbanks, AK, USA

J. Blum, University of Michigan, Ann Arbor, MI, USA

OASIS - 1004. OASIS – Barrow 2005

(2005, Barrow (funded))

P. Shepson, Purdue U., W. Lafayette, IN, USA

OASIS - 1005. Investigation of Oxygen isotopic Anomaly in Nitrate in the Arctic (IOANA)
(2005 at Barrow (funded), 2006 planned at Ny-Ålesund)

J. Savarino, LGGE, Grenoble, France

Collaborations: OOTI campaign (Environment Canada, CA), CHIMERPOL campaign (LGGE)

OASIS - 1006. Transport Mechanisms of Sea Salt to Surface Snow (OSMAR)
(2005 – 2006 at Storfjord, Svalbard (funded))

F. Domine, LGGE, Grenoble, France

Collaborations: C.N.R.-IIA, Roma, Italy

OASIS - 1007. Understanding the role and significance of the Arctic for the cycling and fate of persistent organic pollutants (ARCPOP)
(2005 (funded); 2006 – 2008 (proposed))

C. J. Halsall, Lancaster University, UK

OASIS - 1008. Emissions of Reactive Nitrogen from Polar Snow & Ice Surfaces (ERN)
(2005 – 2006, Ny-Ålesund (funded), 2007 – 2008 Arctic Ocean)

H. Beine, C.N.R. – IIA, Roma, Italy

T. Georgiadis, C.N.R. – IBIMET, Bologna, Italy

OASIS - 1009. The Collaborative O-Buoy Project: Engineering and Deployment of a Network of Arctic Ocean Chemical Sensors for the IPY and beyond (SIRG)
(2005 – 2009, proposed)

P. Matrai, Bigelow Laboratory, W. Boothbay Harbor, ME, USA

P. Shepson, Purdue U., West Lafayette, IN, USA

D. Perovich, USACE-CRREL, Hanover, NH, USA

B. Simpson, U. Alaska Fairbanks, Fairbanks, AK, USA

J.W. Bottenheim, Environment Canada, Toronto, ON, Canada

U. Platt, IUP, U Heidelberg, Heidelberg, Germany

OASIS - 1010. BIologically mediated PRocesses in OASIS EXchange (BIPREX)
(2006 – 2009 (proposed))

M. Modigh, Stazione Zoologica A. Dohrn, Villa Comunale Napoli, Italy

OASIS - 1011. Photochemistry of organic pollutants in Arctic snow and ice: Exploring atmosphere/snow/ice interactions through integrated research and education
(IPY EoI 699)

A. Grannas, Villanova University, Villanova, PA, USA

OASIS - 1012. The Biogeochemical Cycle of Organo-Halogens in Polar Regions
(2005 – 2007 (partly funded))

K. Abrahamsson, Chalmers University of Technology, Göteborg, Sweden

OASIS - 1013. Below ice Environmental Laboratory UsinG an AUV (BELUGA)
(IPY EoI (698))

N. Bose, Memorial University of Newfoundland, St. John's, NL, Canada

J. Ferguson, International Submarine Engineering Ltd., Port Coquitlam, BC, Canada.

M. Williams, Institute for Ocean Technology, National Research Council, Canada.

G. Griffiths, Southampton Oceanography Centre, Southampton, UK.

V. Rigaud, IFREMER, La Seyne sur Mer, France.

OASIS - 1014. Aeolian and ice transport and fluxes of matter (including ecotoxicants) in the Arctic (CRYOEOL)
(IPY EoI 323)

V. Shevchenko, P.P. Shirshov Institute of Oceanology, Moscow, Russia

S. Gerland, Norwegian Polar Institute, Tromsø, Norway

J. Pacyna, Norwegian Institute for Air Research, Kjeller, Norway

R. Stein, M. Kriews, C. Haas Alfred Wegener Institute, Bremerhaven, Germany

H. Kassens, IFM-GEOMAR, Kiel, Germany
H. Eicken, Geophysical Institute, University of Alaska, Fairbanks, AK, USA
V. Korobov, Arkhangel'sk Center for Hydrometeorology and Monitoring of the Environment, Arkhangel'sk, Russia
Dr. V. Sokolov, Arctic and Antarctic Research Institute, St. Petersburg, Russia

OASIS - 1015. Bromine and biogenic sulphate in Arctic aerosols and snow: spatial and temporal relationships.

(EoI 695/ Canada 93)

A.-L. Norman, University of Calgary, Canada

OASIS - 1016. Energy/Mass budget studies over the Ice

(part of IPY – ISAPIE (Interdisciplinary Studies of the Annual Pack Ice Environment), EoI 593)

O. Persson, CIRES, University of Colorado, Boulder, CO, USA

OASIS - 1017. Near-surface trace gas and particle flux measurements over the ice

(part of IPY – ISAPIE (Interdisciplinary Studies of the Annual Pack Ice Environment), EoI 593)

C. Fairall, NOAA ETL, Boulder; CO, USA

D. Helmig, U. Colorado, Boulder, CO, USA

OASIS - 1018. Surface ocean-atmosphere processes

(C-SOLAS Science Theme 1)

M. Levasseur, J.-É. Tremblay, Université Laval, Canada

R. Anderson, K. Azetsu-Scott, W. Perrie, M. Scarratt, S. Vagle, C.S. Wong, Fisheries and Oceans Canada

R. Leitch, Environment Canada, Toronto, Canada.

J. Cullen, University of Victoria, Canada

M. Gosselin, H. Xie, University of Quebec at Rimouski, Canada

R. Moore, H. Thomas, Dalhousie University, Canada

N. Price, McGill University, Canada

R. Rivkin, Memorial University of Newfoundland, Canada

P. Tortell, University of British Columbia, Canada

D. Varela, University of Victoria, Canada

OASIS - 1019. Atmosphere-cryosphere processes

(C-SOLAS Science Theme 2)

M. Levasseur, Université Laval, Canada

J. Abbatt, University of Toronto, Canada

P. Ariya, McGill University, Canada

M. Gosselin, H. Xie, University of Quebec at Rimouski, Canada

C. Michel, L. Miller, Fisheries and Oceans Canada

R. Moore, Dalhousie University, Canada

A.-L. Norman, University of Calgary, Canada

T. Papakyriakou, University of Manitoba, Canada

OASIS - 1020. Atmosphere dynamics and climate feedbacks

(C-SOLAS Science Theme 3)

M. Levasseur, Université Laval, Canada

J. Abbatt, University of Toronto, Canada

A. Bertram, University of British Columbia, Canada

J.-P. Blanchet, University of Quebec at Montreal, Canada

K. Denman, W. Perrie, A. Vézina, K. Von Salzen, Fisheries and Oceans Canada

S. Gong, R. Leitch, Environment Canada

R. Martin, S. Sathyendranath, Dalhousie University, Canada

A.-L. Norman, University of Calgary, Canada

OASIS - 1021. Arctic carbon dioxide fluxes and sea ice carbon biogeochemistry over seasonal transitions.

(part of IPY “Carbon in Sea Ice: Fluxes and Biogeochemistry” (EoI 976))

L. Miller, R. Macdonald, Institute of Ocean Sciences (DFO), Canada

T. Papakyriakou, D. Barber, University of Manitoba, Canada

K. Denman, N. Steiner, University of Victoria, Canada

A.-L. Norman, University of Calgary, Canada

C. Krembs, University of Washington, USA

A. Mucci, McGill University, Canada

W. Drennan, University of Miami, USA

OASIS - 1022. Danish Center for Mercury in the Arctic (DANMARC):

1022.a. Atmospheric Chemistry of Mercury

H. Skov, National Environmental Research Institute, Roskilde, Denmark

1022.b. Atmospheric modeling of Mercury

J. Christensen, National Environmental Research Institute, Roskilde, Denmark

1022.c. Laboratory Studies of reactions of gaseous elemental mercury

M. Johnson, University of Copenhagen, Denmark

1022.d. Measurements of bioavailable mercury

S. Sørensen, University of Copenhagen, Denmark

1022.e. Uptake and bioaccumulation of Hg in the first steps in the food web

T. Gissel Nielsen, National Environmental Research Institute, Roskilde, Denmark

1022.f. Time trend and geographical distribution of mercury in top marine predators

R. Dietz, National Environmental Research Institute, Roskilde, Denmark

1022.g. Toxicological studies of the noxious effects of mercury on humans

J. C. Hansen, University of Århus, Denmark

OASIS - 1023. Organic-metal interactions in snow

(2004-2005 Resolute (funded); 2006-2008, Arctic ocean)

P.A. Ariya, G. Kos, E. Hudson, McGill University, Montreal, PQ, Canada

OASIS - 1024. Mercury depletion in the Arctic: Laboratory, field studies and climate modeling
(2002-2005; funded)

P. A. Ariya, F. Raofie, G. Snider, S. Li, S. Shebban, McGill University, Montreal, Canada

M. Amyot, A. Poulain, E. Gracis (Universite de Montreal, Canada)

A. Dastoor, D. Davignon, Meteorological Service of Canada, Dorval, Canada

OASIS - 1025. Bioaerosols in the Arctic and Sub-Arctic

(2003-2005; partly funded; new proposal will be submitted in 2005)

P. A. Ariya, G. Kos, V. Cote, S. Harrison (McGill University, Montreal, Canada)

H. Vali, N. Chan, Faculty of Medicine, McGill University, Montreal, Canada

OASIS - 1026. Investigation of the contribution of black carbon deposition to climate change in
Polar Regions during the IPY (Black Carbon-IPY)

(proposed)

G. Myhre, T. Berntsen, J. Fuglestedt, K. Rypdal, CICERO, Oslo, Norway

S. Gerland, C. A. Pedersen, Norwegian Polar Institute, Tromsø, Norway

K. Holmen, L. R. Hole, NILU, Tromsø, Norway

J. Strøm, Stockholm University, Sweden.

OASIS - 1027. Interaction of sea ice decline and upper ocean warming, and associated
climatologic and ecological processes

(EoI 537)

J. Zhao, Ocean University of China, Qingdao, China

OASIS - 1028. Atmospheric inputs of organic carbon and pollutants to the polar ocean: rates,
significance and outlook (ATOS)

(EoI 147; 2007 – 2008; Bipolar: Cruises in Arctic and Southern Ocean (proposed))

C. M. Duarte, IMEDEA (CSIC-UIB), Mallorca, Spain

S. Agustí, A. Tovar, N. Agawin, T. Arrieta, R. Martínez, IMEDEA
J. Dachs, IIAQB-CSIC, Barcelona, Spain
D. Planas, UQAM, Canada

OASIS - 1029. Atmospheric inputs of mercury to the polar ocean: rates, significance and outlook
(ATMER)
(EoI 321)
D. Planas, UQAM, Canada

OASIS - 1030. Polynya studies by in situ observations, remote sensing, numerical and laboratory experiments
(proposed)
R. Purini, C. Rafanelli, CNR-ISAC, Roma, Italy
G. B. Cannelli, CNR – IDAC, Roma, Italy
F. Parmiggiani, CNR – ISAC, Bologna, Italy
A. Longhetto, Università di Torino, Italy
G. Leuzzi, Università di Roma, Italy

OASIS - 1031. BrO DOAS
(planned)
B. Simpson, U. Alaska Fairbanks, Fairbanks, AK, USA
U. Platt, University Heidelberg, Heidelberg, Germany

OASIS - 1032. BrO Instrument
(planned)
D. Toohey, University of Colorado, Boulder, CO, USA

OASIS - 1033. Impact of combined iodine and bromine release on the Arctic atmosphere
(COBRA)
(2007 – 2008, planned)
L. Carpenter, University of York, UK
A. Lewis, University of York, UK
H. Coe, M. Gallagher, G. McFiggans, Manchester
E. Wolff, A. Jones, H. Roscoe, M. Hutterli, British Antarctic Survey, Cambridge, UK
J. Plane, UEA
J. Pyle, Cambridge
L. Poissant, Montreal

OASIS - 1034. Laboratory experiments of halogen activation on salty ice surfaces
(planned)
H.-W. Jacobi, AWI-Bremerhaven, Germany
J. P. Burrows, L. Kaleschke, J. Notholt, G. Heygster, Institute of Environmental Physics, University of Bremen, Germany
C. Zetzsch, Universität Bayreuth, Germany
J. Crowley, R. Sander, Max-Planck-Institute for Chemistry, Mainz, Germany

OASIS - 1035. Remote sensing of ocean, atmosphere, sea ice and snowpack parameters
(planned)
H.-W. Jacobi, C. Haas, W. Dierking, AWI-Bremerhaven, Germany
J. P. Burrows, L. Kaleschke, J. Notholt, G. Heygster, A. A. Kokhanovsky, Institute of Environmental Physics, University of Bremen, Germany
G. Heinemann, Meteorological Institute of the University of Bonn, Germany
D. Stammer, S. Kern, Center for Marine and Atmospheric Research, University of Hamburg, Germany (IPY-EoI 308)
U. Platt, R. von Glasow, J. Hollwedel, T. Wagner, University of Heidelberg, Germany

OASIS - 1036. Air chemistry modeling and measurements
(planned)

H.-W. Jacobi, AWI-Bremerhaven, Germany
J. P. Burrows, L. Kaleschke, J. Notholt, G. Heygster, Institute of Environmental Physics,
University of Bremen, Germany
C. Zetzsch, Universität Bayreuth, Germany
R. Ebinghaus, GKSS Forschungszentrum Geesthacht GmbH, Geesthacht, Germany
U. Platt, R. von Glasow, J. Hollwedel, T. Wagner, University of Heidelberg, Germany
W. Junkermann, Forschungszentrum Karlsruhe, Germany
J. Müller, Fed.Environmental Agency, Langen, Germany
J. Crowley, R. Sander, Max-Planck-Institute for Chemistry, Mainz, Germany

OASIS - 1037. Ocean-atmosphere-sea-ice-snowpack modeling and development of improved
physico-chemical descriptions and parameterizations of feedbacks
(planned)

H.-W. Jacobi, AWI-Bremerhaven, Germany
G. Heinemann, Meteorological Institute of the University of Bonn, Germany
J. P. Burrows, L. Kaleschke, J. Notholt, G. Heygster, A. A. Kokhanovsky, Institute of
Environmental Physics, University of Bremen, Germany
R. Ebinghaus, GKSS Forschungszentrum Geesthacht GmbH, Geesthacht, Germany
D. Stammer, S. Kern, Center for Marine and Atmospheric Research, University of Hamburg,
Germany
U. Platt, R. von Glasow, J. Hollwedel, T. Wagner, University of Heidelberg, Germany
W. Junkermann, Forschungszentrum Karlsruhe, Germany
J. Crowley, R. Sander, Max-Planck-Institute for Chemistry, Mainz, Germany

OASIS - 1038. Investigation of the arctic planetary boundary layer structure and aerosol
composition from in situ aircraft studies
(planned)

W. Junkermann, Forschungszentrum Karlsruhe, Germany

OASIS - 1039. Cooperation with EoI 134 in THORPEX-IPY

K. Dethloff, AWI-Potsdam, Germany

OASIS - 1040. Microphysics and State of mixing of anthropogenic and background aerosol
components in the Arctic. Observations and modelling

K. Eleftheriadis, C. Housiadas N.C.S.R. "Demokritos"

M. Lazaridis, Technical University of Crete

G. Hourdakos, Raymetrics S.A.

A. Papayannis N.T.U. of Athens.

OASIS - 1041. Air-Snow Transfer Processes: Measurements and Modeling

(2007-2009, Arctic Ocean and Svalbard, planned)

M. Albert, Cold Regions Research & Engineering Lab and Dartmouth College, Hanover, N.H.,
USA

OASIS - 1042. Impact on tropospheric O₃ of photochemical exchange within the Arctic sea ice.
(planned)

K. C. Clemitshaw, Imperial College, London, U.K.

M. D. King, Royal Holloway, London, U.K.

D. Shallcross, Univ. Bristol, U.K.

A. Jones, BAS, Cambridge, U.K.

OASIS - 1043. The fate of mercury in Arctic regions. The roles that sea ice, ocean, snow and the
atmosphere play on the Hg cycle

(planned)

C. Ferrari, E. Bahlmann, X. Fain, R. Hennebelle, CNRS – LGGE, Grenoble, France

S. Brooks, Oak Ridge National Laboratory, USA

R. Ebinghaus, C. Temme, GKSS Research Centre, Geesthacht, Germany

H. Skov, National Environmental Research Institute, Roskilde, Denmark

A. Steffen, Environment Canada, Toronto, Canada
 C. Barbante, W. Cairns, P. Cescon. University of Venice, Italy
 T. Berg, NILU, Kjeller, Norway

OASIS - 1044. Pollution related fluxes in Svalbard and surrounding seas – Coupling Air-Sea-Ice fluxes with long time series of atmospheric chemistry (PolFlux)
 (planned)

L. Hole, T. Berg, K. Holmén, J. Pacyna, NILU, Kjeller, Norway
 S. Gerland, E. Isaksson, T. Svenøe, Norwegian Polar Institute, Tromsø, Norway
 A. Sjöblom, University Center, Longyearbyen, Svalbard
 P. Glowacki, Polish Polar Station Hornsund, Svalbard

OASIS - 1045. Tropospheric Ozone Depletion Events Observed with Lidar Profiles
 (planned)

J. Machol, University of Colorado, CO, USA

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
Jan Bottenheim	Environment Canada	Canada
Paty Matrai	Bigelow	USA
Len Barrie	WMO	Switzerland
Christopher Krembs	U. Washington	USA
Don Perovich	CRREL	USA
Florent Dominé	CNRS - LGGE	France
Lisa Miller	Institute of Ocean Sciences	Canada

Maurice Levasseur	Universite Laval	Canada
Neil Bose	Memorial University of Newfoundland	Canada
Jinping Zhao	Ocean University of China	China
Christophe Ferrari	CNRS - LGGE	France
Lars Kaleschke	University of Bremen	Germany
Kostas Eleftheriadis	N.C.S.R. "Demokritos"	Greece
Jozef Pacyna	NILU	Norway
Lars Otto Reiersen	AMAP	Norway
Lars R. Hole	UNIS / NILU	Norway
Piotr Glowacki	Polish Academy of Sciences	Poland
Vladimir Shevchenko	Shirshov Institute of Oceanology	Russia
Bill Sturges	U. East Anglia	UK
Martin King	Royal Holloway, London	UK
Michelle Holm	U. Colorado; National Snow and Ice Data Center	USA