

FARO 2003

Forum of Arctic Research Operators

CANADA: Chair (absent) Operator	Ms. Bonni A. Hrycyk, Director Polar Continental Shelf Project 615 Booth Street, Room 233 Ottawa, ON K1A 0E9	Fax: 1 613 947 1611 Phone: 1 613 947 1601 Email: bhrycyk@gsc.nrcan.gc.ca
Observer	Martin Bergmann, Director, Arctic Science Program Development Department of Fisheries and Oceans Freshwater Institute 501 University Crescent Winnipeg, Manitoba R3T 2N6	Fax: 1-204 984 2401 E-mail: bergmannm@dfo-mpo.qc.ca
Observer	Mr Steven Bigras Executive Director Canadian Polar Commission 360 Albert St., Suite 1710 Constitution Square Ottawa, Ontario, K1R 7X7	Phone: 1-613 943 8605 Fax: 1-613 943 8607 bigrass@polarcom.gc.ca
Observer	Dr. Peter Johnson Université d'Ottawa Département de Géographie 165 Waller St. Ottawa ON K1N 6N5	Phone: 1-613 562 5800 x 1061 Fax: 1-613 562 5145 E-mail: peterj@uottawa.ca

CHINA: Operator	Dr Zhanhai Zhang Chinese Antarctic Administration – CACPR 1 Fuxingmenwai Avenue, Beijing 100860	Fax: 68 10 6801 2776 E-mail: zhangzhanhai@263.net.cn
Observer	Mr Wang Yong Chinese Antarctic Administration – CACPR 1 Fuxingmenwai Avenue, Beijing 100860	E-mail : wang-yong@263.net.cn

CZECH REPUBLIC Observer	Dr Josef Elster Academy of Sciences CR Istitute of Botany CZ-37982 TREBON	Phone : 420-384 721156 Fax : 420 384 721136 E-mail : ELSTER@BUTBN.CAS.CZ
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DENMARK Operator	Direktør Hanne Petersen Danish Polar Center Strandgade 100 H DK-1401 Copenhagen K	Fax: 45 32 88 01 01 Phone: 45 32 88 01 00 E-mail: hkp@dpc.dk
Operator	Dr Morten Rasch Danish Polar Center Strandgade 100 H DK – 1401 Copenhagen K	Phone :45-234 90645 E-mail : mr@dpc.dk
Observer	Dr Naja Mikkelsen Danish Polar Center Strandgade 100 H DK – 1401 Copenhagen	

FINLAND	Dr Pentti Mälkki, Director	Fax: 358 9613 94494
Operator	Finnish Institute of Marine Research P O Box 33 FI-00931 Helsinki	Phone 358 9 613 941 E-mail: Pentti.Malkki@fimr.fi
Observer	Mika Kalakoski Finnish Institute of Marine Research P O Box 33 FI-00931 Helsinki	
Observer	Prof. Dr Paula Kankaapää Arctic Centre University of Lapland P O Box 122 96101 Rovaniemi FINLAND	Fax : 358 16 341 2777 Phone : 358 16 341 2768 E-mail : paula.kankaanpaa@urova.fi
FRANCE	Dr Gérard Jugie	Fax: 33-2 980 56510
Operator	Directeur de l'Institut Polaire P B 75 29280 PLOUZANE	Phone: 33-2 980 56502 E-mail: dirpol@ifremer.fr
Observer	Dr Frank Delbart Logistics Manager l'Institut Polaire P B 75 29280 PLOUZANE	E-mail: fdelbart@ifrtp.ifremer.fr
GERMANY:	Dr Hartwig Gernandt	Fax: 49 471 4831 1355
Operator	AWI for Polar and Marine Research Columbusstrasse D-27568 Bremerhaven	Phone: 49 471 4831 1160 E-mail: hgernandt@awi-bremerhaven.de
Operator	Dr Roland Neuber AWI Telefragenberg A43 D-14473 Potsdam	E-mail : neuber@awi-potsdam.de
Operator	Prof. Jörn Thiede AWI for Polar and Marine Research Columbusstrasse D-27568 Bremerhaven	E-mail : jthiede@awi-bremerhaven.de
Observer	Prof. Dr Dieter Fütterer AWI for Polar and Marine Research Columbusstrasse D-27568 Bremerhaven	Fax: 49-471-4831-149 Phone: 49-471-4831-200 Telex: 238695 polar d E-mail: dfuetterer@awi-bremerhaven.de
Observer	Dr Volker Rachold AWI for Polar and Marine Research P O Box 12 01 61 D-27515 Bremerhaven	E-mail: vrachold@awi-bremerhaven.de Fax: + 49-471-4831-1149 Phone: + 49-471-4831-1202

ICELAND Operator	Dr Kristján Kristjánsson RANNÍS Laugavegi 13 IS - 101 Reykjavik	Fax: 354 552 9814 Phone: 354 515 5800 E-mail: kristjank@rannis.is
ITALY: Operator	Dr Roberto Sparapani Istituto Sull'Inquinamento Atmosferico (ITA) Consiglio Nazionale delle Ricerche (CNR) Via Salaria RM 29300 Monterotondo (ROMA) 00016	Fax: 39 - 69 076 2660 Phone: 39-69 067 2632 E-mail: baseartico@iia.mlib.cnr.it
JAPAN: Operator	Professor Okitsugu Watanabe, Director National Institute of Polar Research 9-10, Kaga 1-Chome, Itabashi-ku Tokyo 1173	Fax: 81 3 3962 2529 Phone: 81 3 3962 0150 E-mail: watanabe@nipr.ac.jp
Observer	Dr Yoshiyuki Fujii, Director Arctic Environment Research Center National Institute of Polar Research 1-9-10 Kaga, Itabashi Tokyo 173-8515	Fax: 81 3 3962 5701 E-mail: arctic@nipr.ac.jp
REP. OF KOREA Operator	Dr Yeadong Kim, Director Polar Science Laboratory, KORDI Ansan P O Box 29 Seoul 425-600	Phone: 82 31 400 6400 Fax: 82-31408 5825 E-mail: ydkim@kordi.re.kr
Observer	Dr Byong-Kwon Park Korea Research Council of Public Science and Technology 305 Diplomatic Center, 1376-1 Seocho 2-dong, Seocho-Ku, Seoul 137-072	Fax: 82 2 578 7594 Phone: 82 2 578 1261 E-mail: bkpark@korp.re.kr
THE NETHERLANDS Operator	Prof. Dr. Louwrens Hacquebord RUG, Arctic Centre P. O. Box 716, NL-9700 AS Groningen	Fax: 31-503-634900 Phone: 31-503-636832 E-mail: L. Hacquebord@let.rug.nl
Observer	Prof. Jan H Stel NWO/ALW Laan van N.O. Indië 300 2509 AM The Hague	Phone : 31-70 3440842 Fax : 31-70 383 2173 jh.stel@icis.unimaas.nl
NORWAY: Operator <i>Chair for the Meeting</i>	Professor Olav Orheim, Director Norwegian Polar Institute Polarmiljøsentret N-9005 TROMSØ	Fax: 47 77 75 05 01 Phone: 47 77 75 05 00 E-mail: orheim@npolar.no
POLAND: Operator	Dr. Piotr Glowacki Dept. of Polar and Marine Research Polish Academy of Sciences ul. Ksieceia Janusza 64 01-452 Warszawa	Fax: 48 22 6915893 Phone: 48 22 6915890 E-mail: glowacki@igf.edu.pl

Observer	Prof. Jacek Jania Department of Geomorphology Univ. of Silesia, Faculty of Earth Science ul. Bedzinska 60 41-200 Sosnowiec	E-mail: jjania@us.edu.pl
RUSSIA Operator	Dr Sergei Priamikov Arctic and Antarctic Research Institute 38 Bering str. 199397 St Petersburg	Phone: 7-812 352 0096 Fax: 7-812-352-2688 E-mail: priamiks@aari.nw.ru Web: www.aari.nw.ru
Observer	Boris A Morgunov, Deputy Head Department of Env. and Natural Resources Ministry of Economic Development and Trade of Russian Federation, 1 st Tverskaya-Yamskaya Street 1,3 125993, GSP-3 Moscow A-47	Fax: 7-095 203 2372 Phone: 7 095 248 8675 E-mail: mecon@nm.ru
Observer	Dr. Vladimir I. Pavlenko Director of Arctic Research Centre Russian Academy of Sciences Shvernich 4 117 036 MOSCOW	Fax: 7-095-237 9050 Phone: 7-095 237 9050 E-mail: arctic@pran.ru
SWEDEN Operator	Prof. Anders Karlqvist Swedish Polar Research Secretariat Box 50005 S-10405 Stockholm	Fax: 46-8-152057 Phone: 46-8-673 9600 Email: anders@polar.kva.se
UNITED KINGDOM Operator	Dr John R Dudeney, Deputy Director British Antarctic Survey High Cross, Madingley Road Cambridge CB3 0ET	Fax: 44 1223 350 456 Phone: 1223 22 1523 J.Dudeney@bas.ac.uk
Observer	Professor Elizabeth M Morris, OBE British Antarctic Survey Scott Polar Research Institute Lensfield Road Cambridge, CB2 1ER	Phone : 44 1223 336568 Fax : 44 1223 336549E-mail: emmo@nerc-bas.ac.uk
USA Operator	Dr. Thomas Pyle, Office of Polar Programs Arctic Sciences Section National Science Foundation 4201 Wilson Blvd., Room 740 Arlington, VA 22230	Fax: 1 703 292-9081 Phone: 1 703 306 1029 E-mail: tpyle@nsf.gov
Operator	Simon Stephenson, Office of Polar Programs Arctic Sciences Section National Science Foundation 4201 Wilson Blvd., Room 740 Arlington, VA 22230	Phone: 1-703 292 7435 E-mail: sstephen@nsf.gov
Observer	Dr. Garret W. Brass, Executive Director US Arctic Research Commission 4350 North Fairfax Drive, Suite 630 Arlington, VA 22203	Fax: 1 703 525 0114 Phone: 1 703 525 0111 E-mail: g.brass@arctic.gov

Observer Dr John Calder
NOAA/Arctic Research Office
1135 East-West Highway
Silver Spring, MD 20910
Fax : 1-301 713 2519
Phone : 1-301 713 2518 x 288
E-mail : john.calder@noaa.gov

Observer Professor Patrick John Webber, PhD
Department of Botany and Plant Pathology
100 North Kedzie
Michigan State University
East Lansing, MI 48824
Fax: 1-517 432 2159 or 2050
Phone: 1-517 355 1284
E-mail: webber@msu.edu

Observer George B Newton
US Arctic Research Commission
4350 N Fairfax Dr. 630
Arlington VA 22203
Phone : 1 703 525 0111
Fdx : 1-703 525 0114
E-mail : gbnewton@plansys.com

Observer Dr Jackie M Grebmeier
SBI Project Office, Dept. Ecol. & Evol. Bio.
10515 Research Dr., Bldg. A, Suite 100
University of Tennessee, Knoxville, TN 37932
Phone : 1-865 974 2592
Fax : 1 865 974 7896
E-mail : jgrebmei@utk.edu

Observer Dr Craig Tweedie
100 North Kedzie Hall
Michigan State University
East Lansing, MI 48824
Phone : 1 517 355 1285
1-517 432 2150
E-mail : tweedie@msu.edu

Observer Jerry Brown
P O Box 7
Woods Hole, MA 02543
E-mail : jerrybrown@igc.apc.org

Observer Dr René Eppi
National Oceanic & Atmosphere Administration
OAR/IA
1315 East West Hwy. 11230
Silver Spring, Maryland 21029
Phone : 1 301 713 2469 x 132
Fax : 1 301 713 1459
E-mail : RENÉ.EPPI@NOAA.GOV

European Polar Board Dr Paul Egerton
Executive Scientific Secretary
European Polar Board
Observer European Science Foundation
1 quai Lezay-Marnésia
67080 Strasbourg Cedex, FRANCE
Phone: 33 3 88 767159
Fax: 33 3 88 76 71 80
E-mail: pegerton@esf.org
epb@esf.org
www.esf.org

IASC Odd Rogne, Executive Secretary
IASC Secretariat
P O Box 5156 Majorstuen
0302 Oslo
Fax: +47 22 95 99 01
Phone: +47 22 95 99 02
E-mail: iasc@iasc.no

CEON: A Circum-Arctic Environmental Observatories Network

Craig E. Tweedie¹, Patrick J. Webber¹, Thomas Pyle².

1. 100 North Kedzie Hall, Michigan State University, East Lansing, MI48824, USA.
2. U.S. National Science Foundation, 4201 Wilson Boulevard, Arlington, VA22230, USA
tweedie@msu.edu, webber@msu.edu, tpile@nsf.gov

The concept of a terrestrial Circum-arctic Environmental Observatories Network (CEON) was introduced at Arctic Science Summit Week (ASSW) in 2000 at a meeting of the Forum of Arctic Research Operators (FARO: www.faro-arctic.org). CEON is conditioned by the need for increased international integration of research effort and the loss and/or danger of loss of continuous northern high latitude environmental observations. FARO has supported the CEON concept advocating that CEON be developed to promote environmental measurements and dissemination of these to Arctic researchers whilst encompassing and building on the strengths of existing arctic stations and environmental observatory networks. Since 2000, the CEON concept has increasingly received enthusiastic support from a variety of existing networks, disciplinary collaborations and research stations as well endorsement from the Executive Committee of the International Arctic Science Committee (IASC) (www.iasc.no).

At ASSW 2002, a working group was formed to scope and develop the concept of CEON. Since then, presentations of the CEON concept have been made at meetings of various networks, research collaborations and polar research boards in Europe, Russia and the United States in order to make contact and collect feedback from potential CEON stakeholder and user groups. Presentations have focused on the necessity for the CEON initiative to meet and promote the needs of the participating research community, science administrators, policy makers, industry, education and indigenous communities. In doing so, it has been stressed that CEON should be seen as a facilitatory network that encourages environmental monitoring and provides linkages between disciplines and existing networks and connectivity spanning regional to circumarctic and global scales. Following CEON presentations audiences have been asked to introduce their own bias in the development of CEON by providing feedback to the following question: *“What would you do if you had the opportunity to conduct standardized long term, integrated measurements across all research stations and networks in the Arctic?”* It is hoped that this approach will facilitate the development and scope of CEON based on the experience, needs and future directions envisaged by a broad range of potential CEON stakeholder and user groups.

The CEON initiative should not be seen as duplicating prior or ongoing research effort, but an international partnership that aims at forming a logistic and research framework within which ongoing and future research can be oriented to cumulatively form and facilitate long-term research endeavors in the Arctic. Based on recent scoping and development activities, this report will recapitulate the enthusiastic support for the initiation of CEON and outline a conceptual roadmap for its inception. This road map will include the formation of an interim multidisciplinary and international steering committee, an international workshop and implementation strategy. It is hoped that FARO and the IASC Council formally endorse and facilitate the initiation of CEON. We invite your thoughts and ideas to facilitate the development of the CEON initiative.



The CEON Concept

- The concept of a terrestrial CEON was introduced at a FARO meeting at ASSW 2000.
- Promote sustained high quality environmental observations in the Arctic.
- Promote dissemination of environmental observations to Arctic researchers.
- Encompass & build on the strengths of existing stations & environmental observatory networks within the Arctic.



CEON Activities Since ASSW 2002

Following formation of a CEON working group at ASSW 2002.

- Numerous **exchanges** between FARO, IASC, established arctic networks, research specialists, funding agencies & ongoing & developing collaborations.
- **Web site:** www.cevl.msu.edu/ael/projects/ceon.html
- Article in most recent issue of International Permafrost Association's '**Frozen Ground**'.
- **Nine presentations & stimulating questions & discussions at national/ international meetings.**
 - *Alaska NEON workshop, Fairbanks (USA), August 26, 2002.*
 - *ENVINET meeting, Abisko (Sweden), September 11-15, 2002.*
 - *IASC/ITEX/FATE - CATB workshop, Finse (Norway), October 3-4, 2002.*
 - *ITEX Finse (Norway), October 5-7, 2002.*
 - *SCANNET meeting, Reykjavik (Iceland), October 16-20, 2002.*
 - *CALM workshop, Lewes, (USA), November 11-15, 2002.*
 - *US Polar Research Board meeting, Washington (USA), November 25, 2002.*
 - *ARCSS Meeting AGU, San Francisco (USA), December 5, 2002.*
 - *US Arctic LTER Meeting, Woods Hole (USA), March 1-4, 2003.*

Feedback...

- Base CEON activities on a concept of facilitation incorporating top-down & bottom-up directives.
- Many ideas from CEON stakeholder & user groups spanning existing research stations, site & disciplinary networks, indigenous organizations, funding agencies, & data archives have been collected.
- Specifically:
 - Common meetings of interest groups.
 - Development of a methods manual (education potential).
 - Dispersion of standardized instrumentation (with near-real time availability of data if possible).
 - Re-occupation of former research sites/ data rescue/ reinforcement of long time series.
 - Involvement of indigenous communities (observations, transfer of traditional knowledge).
 - Support for cross disciplinary/network/site education & knowledge exchange.
- Young people are ready!!!

Rationale of CEON

- **Dramatic changes are occurring** in terrestrial systems of the Arctic. Drivers of change include processes originating within & outside of the Arctic system.
- **Change assessment & predictive power is low & limited/threatened** by loss of sustained observational time series.
- To improve these – **need observation platforms** that provide adequate, diverse & sustained time series observations that cross international boundaries.
- There is an **established infrastructure** & a tremendous amount of research & monitoring ongoing in the Arctic. The broader impacts of this research are not fully tapped.

Proposition to FARO

Based on FARO recognizing that the development CEON to date has been largely conceptual:

- We will encourage FARO to accept development of CEON as:
 - an international endeavor aimed at forming a logistic & research framework within which ongoing & future observation platforms can be encompassed...
 - to cumulatively form & facilitate long-term research endeavors in the Arctic...
 - in order to increase the broader impacts & global connectivity of arctic science.
- We urge FARO to endorse the initiation of CEON:
 - Formation of interim steering committee.
 - Convention of small workshop to draft an implementation plan.
- Provide recommendations of candidates with logistic & research experience in the Arctic & from multiple nations for formation of the interim steering committee.
- Advertise CEON to potential stakeholder & user groups.
- Promote CEON as a 'grass roots' initiative built on the autonomy of stakeholders, & the cooperation & collegiality of partners.

A Conceptual Road Map

1. **Endorsement from FARO & IASC, April 2003.**
 2. Formation of Interim steering committee, May 2003.
 3. Convention of Implementation Strategy workshop, October 2003.
 4. Publication of CEON terms of reference & Draft Implementation Strategy, February 2004.
 5. **Report back to FARO for endorsement of the Implementation Strategy ASSW 2004.**
 6. Convention of a large international workshop of stakeholder and user groups, November 2004.
 7. Publication of Science Plan, February 2005.
 8. **FARO endorse Science Plan ASSW 2005.**
- Working Group meet at ICARP II conference proposed for Autumn 2005.
 - IPY 2007 synthesis effort & delineation of future directions?
 - Sequester support funds throughout to support development of the network.
 - Form partnerships with autonomous stakeholders to embrace & promote sustained Long-term environmental monitoring aimed at improving our understanding of change & variability within the Arctic system.

Zackenber Station

- **Place:** Northeast Greenland, 74° 30'N
- **Facility:** Five smaller houses with laboratories, offices, mess-room and food storage. Accommodation is in Weatherhaven shelters with heating
- **Open for users:** 1 June – 31 August
- **Research programme:** Zackenberg Ecological Research Operations – encompasses research, monitoring and logistics
- **Research projects:** Approximately ten different projects per year. Main focus on Climate Change Feedbacks
- **Monitoring:** Zackenberg runs the most extensive coordinated monitoring of terrestrial and marine ecology in the Arctic. The monitoring includes four subprogrammes, ClimateBasis, GeoBasis, BioBasis and MarineBasis, with a total of c. 350 different parameters being measured.
- **Participation in international networks:** ENVINET, SCANNET, CALM, ITEX and others



What can a small facility like Zackenberg use a concept like CEON for?

•Cooperation – for example:

- Development of common monitoring programmes/techniques at the different facilities
- Common representation in different organisations and at different meetings

•Coordination – for example:

- Experience exchange on eg. monitoring techniques, logistic issues and management practices
- Establishment of comparative studies at several /all facilities

•Standardisation – for example:

- Establishment of 'best practice' protocols for e.g. monitoring techniques and management practices
- Cross alibration of different sensors (e.g. UV-B sensors) used at the different sites

International Polar Year 2007/8 - IPY4

Chris Elfring - US PRB
(celfring@nas.edu)
Chris Rapley - EPB / SCAR
(crapley@bas.ac.uk)

International Geophysical Year 1957-58

- In the Shadow of the Cold War
- Fostered High Level International Co-operation
- Launched Polar Science to a New Level
- Birth of Space Science



IGY Outcomes

- Major advances in knowledge & understanding
 - *Discovery of Van Allen Belts*
 - *Thickness of the Antarctic Ice Sheets*
 - ...
- Establishment of Arctic and Antarctic permanent bases and *in situ* programmes
- Establishment of World Data Centres
- International Research Institutions
 - *SCAR, SCOR, WCRP, etc*
- Antarctic Treaty System



IPY4 - Why?

- Polar regions are integral components of Earth system
- Variable over wide range of timescales - nonlinear
- Respond to, amplify and drive changes elsewhere in system - "active litmus"
- Repository of information on past states of planet
- Exploration incomplete
- Specific scientific policy-relevant issues need to be resolved
- Existing programmes would benefit from burst of energy and coordination
- Previous IPYs and IGY provide reference data for change detection and evaluation
- New satellite assets provide opportunity for advance
- New intensive campaign of observations will lay foundations for future reference

IPY4 - What?

- Intense programme of internationally co-ordinated polar observations and analysis which would not otherwise occur
- Compelling science issues
- Specific short-term outcomes
- Foundation for longer-term commitments
- Build on and enhance existing programmes & initiatives
- Attract and develop next generation of polar scientists
- Engage the public

IPY4 - When?

- 2007/8 - the anniversary of historic IPYs (1882/3, 1932/3, 1957/8)
- 4y to plan and initiate - tight but feasible
- Duration ~2y to allow summer and winter field campaigns in both polar regions
- Availability of satellite assets for "snapshot"
- Observing networks to continue over more extended period

Key Characteristics

- Compelling / substantive science
- Visionary / Inspiring
- Adds value
- Bipolar
- Multidisciplinary
- Truly participative
- Easily understood
- Tangible Outcomes
- Challenging but Achievable

Who is Advocating IPY4?

- Numerous individuals, institutes, agencies, nations
- U.S. Polar Research Board
 - *Brainstorming Workshop Nov. 2002*
- European Polar Board & SCAR
 - *Appointed Coordinator - Feb. 2003*
- International Council of Science (ICSU)
 - *Approved establishment of Planning Group - Feb 2003*

Some proposals to date

- Antarctic rover - Carsey, JPL
- IDEA - Miller, AWI
- "Polar Snapshot" - Jezek/NASA/ESA
- "Under discussion" - WCRP CLIC
- "?" - Canadian Polar Commission
- "Broad programme" - Russia
- ...

Related Initiatives

- IGU International Year of the Earth - UN to sponsor?
- NASA International Heliospheric Year - to become "space weather" component of IPY?
- WCRP GARP + 50
- ...

The Role of the ICSU IPY - Planning Group

- To establish order, coherence and focus
- To formulate a concept for an IPY4
- To design the means of ICSU leading such a programme
- To develop the workplan of the programme

Tasks of the ICSU IPY- Planning Group

- To gather, summarize and make widely available information on existing ideas for an IPY
- To stimulate, encourage and organize debate amongst a wide range of interested parties on the IPY objectives and content
- To formulate a set of objectives for an IPY
- To develop an initial high level Science Plan for an IPY which engages younger scientists throughout the planning process.
- To develop a specific set of objectives targeted at both formal and informal education and the general public.
- To develop a proposed mechanism for the design, development, guidance, and oversight of an IPY

ICSU Planning Timeline:

- Proposal to ICSU May 12, 2004
- Draft plan to the Executive Board at February 2004 meeting
- Report to the ICSU 28th General Assembly in 2005 seeking final endorsement

Organisational Structure

- Planning Group
- International Programme Office / Secretariat
- National Committees
- Programme Groups
 - 5?
 - PG-IPOs?

Some Preliminary Ideas on Content

- Exploration
- Polar Processes
- Change at the Poles
- Education and Outreach

Exploration ideas

- Census of Marine Life
- Observations in Polar night
- Sub-ice environment
- "BEDMAP II"
- Ice divide transects
- Gamburtsev Mountains
- Sea bed mapping for science
- Studies of Core-Mantle
- Human dimensions?

Process ideas

- Role of poles in Earth System : ocean-atmosphere oscillations / teleconnections
- Polar climate-ecosystem-biogeochemical flux interactions
- Evolution - adaptation : link between genome & environment
- Southern Ocean ecosystem processes & sustainability
- Sun-Earth connections - space weather

Monitoring Change ideas

- Selected long-term data sets
- Space snapshot - "Cryoscope"
- "Armada"
- "Backward view"

Education & Outreach ideas

- Leading broadcaster / communicator on each National Committee
- Communication sub group
- Teachers / schoolchildren / general public competition to participate
- Schoolchildren role in analysis

Enabling technologies

- "Fastdrill"
- Autonomous Platforms
- Autonomous Underwater Vehicles
- Unmanned Airborne Vehicles
- Rovers
- ...

But Is There Time?

"Parking lot"

- Data issues
- Human Dimensions
- Other sciences
- Decision support
- ...

Seeking Input!

- Is an IPY4 worthwhile?
- If so, what should be its objectives & characteristics?
- What are the most important issues to address?
- Who are the Hero/Heroines to lead IPY to success?

What Do WE do next?

- Express your ideas this week
- Email your ideas to EPB or US PRB
- Give input at the US PRB/s interactive web forum (after 15th April) at :
www.national-academies.org/prb
- Talk to colleagues and funding organisations so they understand the importance of IPY
- Get ready to form a national committee to interact with the ICSU Planning Group

EPB Session on IPY4

Chris Rapley
ASSW Kiruna 1st April 2003

IGY principles (IUGG GA Rome Sep 1954)

- Programmes should be selected with a view to solving specific problems of the Earth
- Regular scientific facilities of the world must be supplemented by additional observations suitably distributed in space and time as needed for the solution of selected problems

IGY selection criteria

1. Problems requiring concurrent synoptic observations at many points involving cooperative observations by many nations
2. Problems of branches of geophysical sciences whose solution will be aided by the availability of synoptic or other concentrated work during IGY
3. Observations of all major geophysical phenomena in relatively inaccessible regions of the Earth that can be occupied during IGY because of extraordinary effort during that interval, in order to augment our basic knowledge of the Earth and solar influences acting on it
4. Epochal observations of slowly varying terrestrial phenomena, to establish basic information for subsequent comparison at later epochs

Priority to be given to programmes under (1)

IPY4 Issues

- What should be its objectives?
- What principles should apply to selecting content?
- What are the most important issues to address?
- What should be the outcomes?
- Who are the key individuals to lead IPY to success?

EPB Breakout Gp :Key points

- Science Category I : Quantum jump in exploitation of existing science / assets / knowledge / what we can do now that we could not do then
 - e.g. Physical science / climate / teleconnections / accelerated water cycle / dynamic poles (ocean space) / impacts on humans / unique role of polar regions in rapid climate change
 - Exploit existing satellites / field assets / models
 - Devise standard methodologies / interoperability
 - Galvanise the development of new technologies to assist
- Science Category II : New Frontiers
 - Under the ice (land, lake and ocean)
 - Life in extreme environments / genome / biology / evolution / adaptation / census of life
 - Enabling technologies

Key Points cont'd

- Adding value / greater than sum of parts
- Inclusive - involve many nations / all existing bases
- Accessibility - balanced geographic and time distribution of data gather (cf IGY criteria)
- Young researchers
- Not just science - broaden to humanities, general societal interest
- Risk? Push frontiers so accept some failures.
- Implementation by national activities, suitably internationally linked / guided by PG structure with involvement from polar operators, other coordinating bodies?

What to do next?

- Email your ideas to c.rapley@bas.ac.uk and/or celfring@nas.edu
- Give input at the US PRB/s interactive web forum (after 15th April) at : www.national-academies.org/prb
- Talk to colleagues and funding organisations so they understand the importance of IPY
- Get ready to form a national committee to interact with the ICSU Planning Group (use existing instruments if possible. E.g. National Polar Research Committees)

Environmental approach at Ny-Ålesund

Monica Kristensen-Solås, Anna Krzyszowska-Waitkus, Birgit Brosø

An environmentally friendly “green” perspective has lately been introduced in the arctic environmental research and monitoring station at Ny-Ålesund, Spitsbergen, Norway. Kings Bay AS owns and runs the settlement and is a good example how one company had to develop their own rules and regulations applicable for their environmental approach.

A modern centre for Arctic research

Ny-Ålesund, International Arctic Environmental Research and Monitoring Station, is one of the most northerly settlements in the world located on the archipelago of Svalbard, north of Norway (78° 55'N, 11° 56'E). This settlement is a centre for international polar research, with six nations operating their monitoring stations here. Kings Bay AS is responsible for managing the infrastructure, and providing and rendering service to the scientific stations.

“Green” scientific station

Norwegian Government policy is to develop Ny-Ålesund into an international station for research in the natural sciences (White Paper to the Norwegian Parliament No.42, 1992-1993), and into a @green@ scientific station (White Paper to the Norwegian Parliament No. 9, 1999-2000). The goal of the management at Ny-Ålesund is to reduce human impact to the surrounding environment. The Ny-Ålesund Science Managers Advisory Committee (NySMAC) initiated an Environmental Impact Assessment (EIA) study at Ny-Ålesund in 1996. As result of the EIA recommendation, Kings Bay AS developed an Environmental Action Plan. Major projects of this plan include: a waste management plan for the separation, reduction, collection, storage, and waste disposal; revegetation of the areas destroyed by construction activities; reduction of the local air pollution; restoration of cultural monuments; and educational information for employees, scientists, tourists, and other visitors.

Waste management plan

A management plan for waste separation, collection, reduction, reuse, recycling, and/or disposal was developed in 1998 for all members of the community, including scientific stations and various departments at Ny-Ålesund. Currently, solid waste is segregated into 16 categories of which 12 categories are sent away for recycling. The amount of wastes sent away for recycling consisted of approximately 50% of total the wastes (average for 1996/97/98). The recycling centers, where all categories of waste are collected, have been established throughout the community. There, at the source, waste is segregated into the specific categories - the most efficient and cost effective method of waste management.

Small-scale in-vessel composting

Food waste comprised 40% of total wastes, as it was found during the waste assessment analysis in 1998. From this study it was decided to introduce a composting system to reduce the amount of organic waste. A small-scale in-vessel composting system was installed at Ny-Ålesund in 1999 with the capacity to compost 10t/year consisting of 70% food waste and 30% wood chips. The volume of this material is reduced by 60-70%. This is the first case of composting organic wastes on such a scale in the far North Polar Region.

Revegetation, air protection, and work of the scouts

A portion of the compost has been used in the summer of 2000 to fertilize the barren earth around the Amundsen statue to create a "green" Ny-Ålesund. This area was revegetated with 4000 native plants. Another goal of the Environmental Action Plan is to reduce air pollution. This is achieved by encouraging the uses of bicycles instead of motorized vehicles. Cultural monuments at Ny-Ålesund community are protected under the Norwegian Cultural Heritage Act. They are consisting of twenty buildings, the Amundsen mast, and the remains of the coal mining activities. Kings Bay AS is working to protect these monuments. Every summer scouts are invited to work on the maintenance of the buildings. A historical digital photo archive, in collaboration with the Governor of Svalbard, is also in the process of preparation.

Visitor information program

Kings Bay AS has developed a visitor's management instrument that includes creating protected areas, introducing an information program on board tourist's ships prior to arrival, and establishing a nature trail. The protected areas consist of sensitive bird use areas and restricted research areas, where entry is forbidden except for the scientific purposes. All visitors coming from the ships are informed about the needs to protect the Ny-Ålesund environment. The ANy-Ålesund rules prepared by Kings Bay AS have resulted in the creation of a nature and heritage trail that consists of 22 stops with information describing the history, flora, fauna, geography, and scientific stations in the vicinity. Such displays help to confine visitor traffic to the roads in the center of Ny-Ålesund.

Environmental education

An information folder concerning the environment and waste management is delivered to every person staying at Ny-Ålesund including department heads and persons in charge of various scientific stations. An environmental consultant provides an Agree@ seminar every 14 days. This seminar presents motivation for everyone to protect the environment of Ny-Ålesund. Topics at these seminars include: a description of the fragile tundra environment; Kings Bay AS plan to protect the environment, and the waste management plan.

A successful approach by one company

Kings Bay AS has developed its own rules and regulations applicable for their activities in Svalbard. Environmental management developed at Ny-Ålesund is an example of a successful approach developed by one company to coordinate and manage activities occurring between six nations.

New tundra at Ny-Ålesund?

In the autumn of 1999 several hundreds seeds were collected in the vicinity of Ny-Ålesund and sent to the Biological Climate Laboratory in Tromsø for multiplication. Four species (*Poa alpina* var. *vivipara*, *Deschampsia alpina*, *Saxifraga cernua* and *Cochlearia groenlandica*) were multiplied with success and in July of 2000, 4000 plants were planted at the center of Ny-Ålesund. The barren ground surrounding the Amundsen statue was chosen as the pioneering field for Agardening@. Because of the continuous threats from grazing barnacle geese and Svalbard reindeer, the area was totally covered with fencing and frightful plastic banners. So far the plants seem to find themselves comfortable in their new arctic surroundings.

Examples of Ny-Ålesund rules

Do not walk anywhere except on roads and paths

Respect nesting birds

Do not go near scientific instruments

Do not throw cigarette filters or other litter on the ground

Respect the cultural landmarks

Do not go into the buildings marked Private B No Admittance

Waste management

Kings Bay AS prepared waste handling, disposal, and minimization rules for all members of the community including the scientific stations and various departments. The rules are displayed at the recycling centers in all buildings. The main goal is to reduce, reuse, and recycle waste at Ny-Ålesund. Rules of the waste minimization plan include:

- X segregating waste into one of the 16 specific categories at the source-in the work place and dormitory;
- X limiting packaging material;
- X increasing the amount of bulk food products;
- X reusing office paper, computer paper etc.;
- X reusing packaging material stored in the recycling center ;
- X returning to the country of origin unwanted supplies and chemicals.

FARO BRIEFING ON COMNAP'S ACTIVITIES

COMNAP's Fourteenth Meeting was held in Shanghai from 15 – 19 July 2003 in parallel with the first week of SCAR's biennial meeting. The meeting was held at the Exhibition Centre in downtown Shanghai which provided excellent facilities.

In addition to the annual COMNAP Meeting, the biennial "Symposium on Antarctic Logistics and Operations" was a Technical Exhibition attended by suppliers of equipment and services to Antarctic programs.

The principal matters of discussion at the COMNAP meeting were:

- Discussion on a paper to the ATCM in answer to a request for advice on best practice to avoid the discharge of waste water on ice-free inland areas. The paper referred to the results of a survey of national programs to determine current wastewater discharge practices.
- Consideration of a draft paper to the ATCM on questions relating to the application of the proposed Arctic Shipping Code to the Antarctic. A relatively small number of changes were proposed which would make the proposed document acceptable to the Antarctic as well as the Arctic and should then be renamed the "Polar Shipping Code".
It was noted that the draft Arctic Shipping Code was, at that time, to be considered by various IMO committees and that COMNAP would review the document once a final version had been approved by the IMO.
- A paper prepared by COMNAP's Working Group and Non-Government Activities on the interaction between national Antarctic programmes and tourist operators was considered and it was agreed to make it available to the ATCM. The paper indicated that there was positive liaison taking place between the industry tourism body, IAATO, and COMNAP. However, COMNAP noted that "extreme adventure" tourist activities sometimes disrupted research work.
- COMNAP's Air Operations Working Group was briefed on developments by the Australian Antarctic Program to introduce an air link between Hobart and its continental stations using a combination of small jet aircraft. Information on the air link established between Cape Town and Dronning Maud Land by a number of partner programs was also provided.
- COMNAP continues to monitor SCAR activities on the proposed exploration of sub-glacial lakes and exchanges information on the activities of those national programmes involved in related research activities.
- COMNAP agreed to sponsor a workshop focussed on improved weather forecasting in Antarctica.
- COMNAP established a working group in Medical Standards to exchange information among operators that would facilitate exchange of scientists on remote expeditions .

COMNAP's Fifteenth Annual Meeting will take place in Brest, France, from 8 – 11 July 2003. The 2004 Meeting will be held in conjunction with the SCAR meeting to take place in Bremen, Germany.

JCAS/24March03
(revised K Erb 3/28)

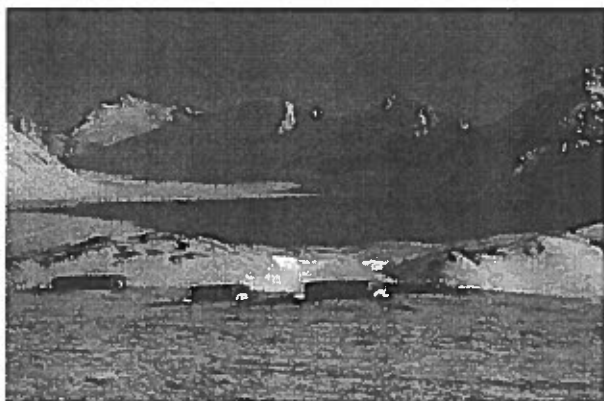


French Polar Institute / IPEV
 Techn. Brest Iroise 29280 Plouzané
 France
www.ifremer.fr/ifrtp
 Date : April, 4, 2003

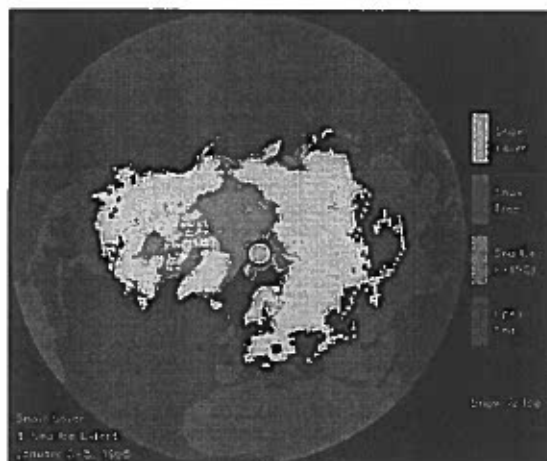
**HYDROGEN FUEL CELLS IN
 NY-ALESUND : A
 COMPLEMENTARY TOOL FOR
 ATMOSPHERIC RESEARCHES ?**

● **PROJECT PRESENTATION**

The international scientific community invested in climate and its short-term changes, large-scale topical theme for the planet's future, met at IPEV on May 2002, so as to confirm the scientific interest of Corbel base in the realization of atmospheric chemistry research programmes on an easy access "clean" site (report available on request). The stakes are of great importance, because a "clean" base in Arctic by 80° North (that is to say in the middle of the Arctic climatic complex) close to an easy logistic servicing and accommodation (Ny Alesund facilities), could represent a significant complementation to the running science on atmospheric research in polar areas, especially in Ny Alesund.



Corbel Base (Spitsberg, 78°54 N, 12°07 E), May 2002
 Situated at 6 km from Ny Alesund village



Spitsberg location and snow pack in winter

● **TECHNICAL VIEWS**

The core of the project is the installation of hydrogen fuel cells in summer 2004, from an initial prototype developed by the French company AIR LIQUIDE. This prototype will be readapted to cold areas using the knowledge of a 3 months experience during a French expedition on the sea ice in 2002, which will be followed by tests in a freezer (May 2003) and finally a "in-situ" test : continuous utilisation for 5 months (winter 2003/2004) at the Corbel Station of the first "polar" prototype.

The global power requested is at least 12 KW (6 fuel cells * 2 KW), using hydrogen bottles filled from an hydrogen generator installed at Ny Alesund Station. The French Polar Institute will include into this project some constraints and development, in the aim to satisfy as much as possible the needs of the scientific community :

- the project integrates the idea of setting up separate and carriable fuel cells. Indeed, twinned with sufficient hydrogen bottles to provide the hydrogen needed, a "2KW-clean-carriable-energy" system could be created, to notably be used on glaciers.
- The project is linked to the development of clean logistics (snow-scooters notably), using also hydrogen fuel cells.

Contact : Project leader Franck Delbart, fdelbart@ifrtp.ifremer.fr



THE AMSI DATABASE

- REQUEST POSSIBLE HAZARDS BE REPORTED
 - BY E-MAIL TO <navsafety@nima.mil>
 - BY TELEPHONE:
 - 1-800-362-6289 IN THE US AND CANADA
 - 1-301-227-3147 OUTSIDE NORTH AMERICA.
 - BY FAX AT 1-301-227-3731.
- ALL HAZARDS WILL BE POSTED ON THE AMSI QUERY PAGE ON THE NIMA WEB SITE
<<http://pollux.nss.nima.mil>>
- THE REPORT FORMAT IS POSTED ON THE NIMA WEB SITE AND ON THE "ARCTICINFO" OF TUESDAY 28 JANUARY 2003.



ARCTIC MARITIME SAFETY INFORMATION (AMSI) DATABASE

- ADMINISTERED BY THE MARITIME SAFETY
DIVISION OF THE U.S. NATIONAL IMAGERY
AND MAPPING AGENCY (NIMA).
- APPLIES TO INTERNATIONAL WATERS OF
THE ARCTIC OCEAN AND ADJACENT SEAS
OUTSIDE OF ALL 16 NAVAREAS.
- THE MOTIVATION IS TO PROTECT EXPENSIVE
INSTRUMENTS AS MUCH AS TO PROTECT
EXPENSIVE SHIPS.



CONCLUSION

- THE AMSI SYSTEM IS VOLUNTARY.
- SAFETY IS PART OF IT.
- EXPENSIVE INSTRUMENTATION IS THE OTHER ISSUE.
- WHAT TO REPORT?
 - ANYTHING THAT IS PLACED IN THE WATER COLUMN!

Morgan BA @
Lenny - gov. per
his Crilly
le 301@cam.ac.uk

