Full Proposals for International Polar Year 2007-2008 Activities

Proposed IPY Activity Details

1.0 PROPOSER INFORMATION

(Activity ID No: 130)

1.1 Title of Activity
Bipolar Climate Machinery - A study of the interplay of northern and southern polar processes in driving and amplifying global climate as recorded in paleoclimate archives and their significance for the generation of realistic estimates of future climate and sea level development.

1.2 Short Form Title of Proposed Activity
Bipolar Climate Machinery (BIPOMAC)

1.3 Activity Leader Details
Rainer Gersonde
Alfred Wegener Institute for Polar and Marine Research
Germany

1.4 Lead International Organisation(s) (if applicable)

1.5 Other Countries involved in the activity
Argentina
Australia
Austria
Canada
China
Denmark
France
Iceland
Israel
Ireland
Italy
New Zealand
Norway
Poland
Russia
Spain
Sweden
UK
USA

1.6 Expression of Intent ID #'s brought together in this proposed activity
62, 15, 33, 37, 43, 46, 53, 59, 79, 103, 105, 106, 121, 127, 142, 178, 186, 240, 323, 378, 419, 437, 491, 511, 522, 529, 601, 606, 629, 722, 724, 775, 816, 873, 885, 1011

1.7 Location of Field Activities

Bipolar

1.8 Which IPY themes are addressed

1.9 What is the main IPY target addressed by this activity
1. Natural or social science

2.0 SUMMARY OF THE ACTIVITY

Paleoclimatic research indicates that processes and conditions in polar regions play a large role in driving and amplifying global climate variability at centennial to millenial time scales. The outstanding role of polar regions in the global climate system is currently evidenced by the distinct warming of polar regions (e.g. Arctic realm, Antarctic Peninsula) that exceed modern warming on a global scale. Polar processes and conditions include biological cycling and physical circulation in the polar oceans, the formation and distribution of sea ice, the behavior of permafrost areas, atmospheric circulation and transport of water vapor, and the volume and stability of continental ice. Polar and subpolar High-Nutrient-Low-Chlorophyll (HNLC) areas may act as CO2 sinks during glacial periods when the increased input of the micronutrient, iron, stimulates primary production. The extent and the seasonal variability of sea ice influences the Earth´s albedo, water mass production, heat and gas exchange between the ocean and atmosphere, and biological productivity. Melt water pulses, which alter surface ocean density gradients, may induce rapid climate change. The impact of such environmental events in the Arctic Ocean, North Atlantic, and Southern Ocean may propagate globally via ocean circulation, through the operation of the "bipolar seesaw". New data suggest a less stable Antarctic ice volume than generally presumed, even during cold periods, and shed new light on the vulnerability of the Antarctic ice sheets and their effect on global ocean circulation and sea level change. What is needed now is determined investigation of these diverse processes so a sophisticated picture of the power of polar regions to drive climate change can be assembled. The international and multidisciplinary effort within the proposed BIPOMAC network will generate the coordinated, broad-ranging influx of knowledge necessary to clarify the intertwined roles of bipolar ice, ocean, and atmospheric processes in climate evolution and sea level change at different operational modes of the "bipolar climate machinery". This wave of knowledge will come from carefully selected marine and terrestrial records covering the Pliocene to Holocene from both polar regions. This will also include records from areas that have to date been sparsely investigated, if at all (central Arctic Ocean, Arctic Pacific, NE Siberia, Antarctic Pacific, Antarctic ice shelf). The better understanding of the polar systems will substantially increase our ability to forecast future climate and sea level change, and help us focus our responses to the environmental challenges that we will be facing.
The BIPOMAC network combines:
(1) "Process studies" to clarify mechanisms of polar sediment deposition and alteration and quantify the impacts on paleoenvironmental proxies. These studies include that of polar land to ocean sediment transfer, sediment and particle fluxes in the polar seas and lakes, and the paleoecological implications of an experiment in the Scotia Sea to test iron addition as a means for CO2 sequestration.
(2) "Paleoenvironmental reconstruction" based on well-dated northern and southern polar paleoceanographic, paleolimnological, terrestrial fossil, and continental ice volume/extent records. Study intervals and areas include: (a) warmer-than-present Pliocene and Pleistocene intervals from the Canadian Arctic (Beaver Pond, Bylot Island), the Atlantic, Indian and Pacific sectors of the Southern Ocean and expected from NE Siberia (El´gygytgyn) and Antarctic near-shore drillsites (ANDRILL); (b) Pleistocene glacial/interglacial cycles from shelf/coastal lowland permafrost and lake deposits of NE Siberia (e.g. Lake El´gygytgyn), North Greenland terrestrial records and from Patagonian/South American lake sediments; and marine deposits from the continental margin and deep Arctic Ocean, the Arctic and Subarctic Pacific, Bering Sea and Sea of Okhotsk, North Atlantic, the Indian, Atlantic (Scotia Sea) and Pacific sectors of the Southern Ocean including near-shore studies in the areas of Prydz Bay, the Antarctic Peninsula and the Ross Sea (e.g. McMurdo Sound); (c) the Late Glacial and Holocene documented in terrestrial,

permafrost and/or lake deposits from a large variety of locations in the Canadian and Russian Arctic, NE Siberia and Kamtchatka, on Svalbard, Southern Ocean islands and in Antarctic coastal areas (e.g. Prydz Bay) together with marine deposits from the Arctic continental shelf and margin, the Arctic Pacific, Bering Sea and Sea of Okchotsk, the Indian, Atlantic (Scotia Sea) and Pacific sectors of the Southern Ocean.
(3) "Numerical modeling" of ice-atmosphere-ocean processes to decipher the complex pathway and timing of climate development, its internal amplification and propagation mechanisms (ice/ocean/atmosphere), and the effect of external forcing (insolation/solar activity).
The BIPOMAC network also includes projects for the development of innovative methods for the enhancement of paleoenvironmental reconstructions based on diatom biomarkers and stable isotopes of biogenic opal and associated organic matter, and the increase in the accuracy of dating with the radiocarbon method in polar, low-carbonate sediments.

2.1 What is the evidence of inter-disciplinarity in this activity?
BIPOMAC will create an organized international collaboration of paleoceanographers, paleobiologists, paleolimnologists, geologists, biogeochemists, geophysicists, glaciologists and Earth system modellers. Paleoenvironmental reconstructions and modelling will be achieved based on close linkages with biologists, oceanographers, sea ice experts and climatologists.

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?
Studies within the BIPOMAC network will generate a wave of new terrestrial and marine data sets from both poles, with a focus on yet little studied regions. The selected study areas represent key regions for the understanding of polar processes that drive and amplify climate change. The major areas where BIPOMAC aims to deliver new, broad, and detailed results are (1) timing and response of polar climate to external and internal forcing mechanisms at Milankovitch and millennial-centennial time scales and its phase relationship to climatic change in mid- and low-latitude areas, (2) the atmosphere-ocean-ice coupling between the Arctic Ocean, the Arctic and Antarctic Pacific, and the West Antarctic Ice Sheet (WAIS), (3) the development and stability of the marine-based WAIS during both cold and warm climate intervals, (4) the behavior of polar High Nutrient, Low Chlorophyll (HNLC) areas, their role in shifts in carbon cycle operations in different climate modes, and the implications for possibilities for carbon sequestration within the deep sea, (5) the characteristics of the polar environment in the past at times warmer than the present day, and (6) the documentation of Holocene climate development and variability and its comparison with modern conditions. The integration of data collected through BIPOMAC with ice core climate data, will help improve numerical models for realistic estimates of future climate and sea level change under different anthropogenic impact scenarios. The latter is of major socio-economic relevance in a world of growing human population and increasing coastal area settlement considering the ongoing global change.

We expect that the BIPOMAC exercise will stimulate and achieve close collaboration between scientists of different disciplines and with yet funded international programs (see 3.1) that will outlive IPY and thus set directions for future cooperation and a better exploitation of available human and financial ressources.

The major deliverables of BIPOMAC will be:
1) new paleoclimatic records based on geochemical, isotopical, sedimentological and micro- and macrofossil data from a large variety of bipolar terrestrial, permafrost, lake and marine deposits (for listing see 2.0 Summary and 2.3)
2) the production of age models for these records to allow correlation of the records from the different studied sources and with ice core climate records.
3) collation of the data into the PANGAEA international database
4) the publication of papers based on the paleoclimatic data as well as on the results of climate simulations from models improved by the BIPOMAC data.

Studies within BIPOMAC will also be used to target new drilling projects in polar oceans (e.g. Arctic Ocean, South Pacific) in the frame of Integrated Ocean Drilling Project (IODP) and in near- and onshore Antarctic areas in the frame of ANDRILL. The projects will be implemented

post-IPY as an outcome of international IPY efforts.

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

Locations	Coordindates
Lake El'gygytgyn, SE of Pevek, Anadyr Mountains, Eastern Chukotka, NE Sibiria	67.30°N, 172.05°E
Relic Proglacial Lake Ulakhan Kyuel (Foreland of the Northern Verkhoyansk Mountains), Lake Syrdach and other Thermokarst Lakes (Central Yakutia)	67°45'N, 124°15'E; 62°33'N, 130°55'E
Central Yakutia and the Verkhoyansk Mountain System	62°N ,132°E; 66°N,128°E
Shelf and Coastal Lowland Region of NE Siberia	130°E-150°E
McDougall Sound, Resolute Bay, Nunavut, Canada	75°N, 95°W
Beaver Pond, Ellesmere Island, Nunavut, Canada	78º 33'N; 82º20'W and region
Strathcona Fiord, Ellesmere Island, Nunavut, Arctic Canada	78°33'N, 82°20'W
South-Western Plain of Bylot Island, Sirmilik National Park	72°N, 80°W

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

Arctic Fieldwork time frame(s)	Antarctic Fieldwork time frame(s)
06/07 - 08/07	02/07 - 04/07
06/08 - 10/08	09/07 - 03/08
06/09 - 09/09	10/08 - 04/09

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

Further details – 2.3 Geographical locations with coordinates (continued) Peary Land, Northern Greenland 82-84°N, 20-34°W; Northern Ellesmere Island area 82°13´N, 72°13´W and region; Axel Heiberg Island area 81°N,95°14´W and region; Islands of the westernmost Arctic Archipelago (Prince Patrick, Melville, Borden Islands) 78°30-78°50´N,110°46-113°07´W; Russian Archipelago (Novaya Zemlya, the New Siberian Islands, etc.) 44°50'-65°25'E, 79°50'-81°50'N; Hornsund Fjord and adjacent shelf, Western Spitsbergen, Svalbard 77°N 15°E; Nyalesund, Svalbard 78°55N, 11°50E; Linné Glacier, Linné Valley, and Linné Lake, near Kapp Linné, Svalbard 78°05'N, 12°40'E; Fram Strait, Yermak Plateau, Norwegian-Greenland Seas 015°E, 80°N and 010°W, 70°N; Central Arctic, Alpha Meneleev Ridge 075°W, 85°N; Arctic and Subarctic Pacific Latitudinal transects at ca.165°E, 175°W, 150°W; Bering Sea latitudinal transect 175°W; Okhotsk Sea transects; Indian sector of Southern Ocean Latitudinal transects at ca. 55°E, 70°E; Kerguelen Island (Indian Sector of Southern Ocean) 43°S,67°E; Marion Island (Indian Sector of Southern Ocean) 46°54'S, 37°51'E; Heard Island (Indian Sector of Southern Ocean) 53°06´S, 72°31E; McDonald Island (Indian Sector of Southern Ocean) 53°06´S, 72°31'E; Jetty Oasis lakes (Pr Charles Mtns) 70°S, 68°E and region; Lakes near Davis station (Ingr. Christensen Coast) 68°S,78°E and region; Pricess Elisabeth Land, coastal East Antarctica Sector between 70°E-80°E; Scotia Sea Latitudinal transect at ca.45°W; Drake Passage transects ca. 70°W; Antarctic Peninsula Sector between 60°-80°W; Larsen B and C ice shelf area, Mobiloil

inlet 68°S, 65°E; Pacific sector of Southern Ocean Latitudinal transects at ca. 170°W, 150°W, 120°W; Ross Sea Mooring Site A 76°42'S, 169°04'E; Ross Sea Mooring Site B 74°S, 175°05'E; Ross Sea Transects around 180°E south of 70°S; ANDRILL-site Southern McMurdo Sound (SMS) 77°43´S, 165°20´E; ANDRILL site McMurdo Ice Shelf (MIS) 77°53´S, 167°10´E; Ross Ice Shelf; Western Coast of Ross Sea, and adjacent Mountains with focus on Northern Victoria Land, including Offshore Islands (Franklin Island, etc.), and Rennick Glacier; Off-shore Wilkes Land Sector between 120°E-150°E; 2.4 Approx. timeframe for proposed field activity (continued) Antarctic Fieldwork time frame 10/09 2.5 Required logistic support/facilities (continued) Rock-drilling capability, Fuel depots, Snow terrain vehicles, Lake boats and drilling platforms, New field stations

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

2.7 If working in the Arctic regions, has there been contact with local indigenous groups or relevant authorities regarding access?
Contacts with the following authorities and indigenous group representatives have been or will be established: Sysselmannen (Svalbard), Dough Stenton (Director of Heritage, Nunavut, Canada), Russian authorities for access to the Russian Arctic.

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 BIPOMAC network includes parts of international programs ACE, ANDRILL, El'gygytgyn Deep Drilling

3.2 How will the activity be organised and managed? Describe the proposed management structure and means for coordinating across the cluster
BIPOMAC is a network of individually funded and managed projects and projects groups. The network will be coordinated by an international Steering Committee (BIPOMAC-SC), including experts on paleoceanography, paleolimology, biogeochemistry, Earth system and climate modelling, data management, education & outreach and the planning and implementation of polar expeditions. The main duties of the BIPOMAC-SC will be to (1) build and guide the BIPOMAC scientific network, (2) establish joint science, action, and logistics plans in coordination with scientific personnel of the BIPOMAC network, (3) develop and maintain links with other IPY-core activities, (4) organize international meetings for scientific exchange and logistical coordination, (5) oversee data management, (6) guide education & outreach components, and (7) organize joint publication in peer-reviewed journals.

On-line communication among the BIPOMAC contributors will be achieved with a web-based forum and database. Funding for the operation of this website must be provided by the different BIPOMAC projects.

3.3 Will the activity leave a legacy of infrastructure and if so in what form?
The BIPOMAC will leave a legacy of scientific infrastructure including terrestrial and marine samples and data sets as well as a structure of interdisciplinary cooperation for future investigations and programs. It will also significantly contribute to the construction of a database of polar paleoceanographic and paleolimnological data with age models that allow for their comparison with each other and with climatic signals from polar ice cores.

3.4 Will the activity involve nations other than traditional polar nations? How will this be addressed?
Cooperation with nations lacking a strong tradition in polar research (e.g. Israel) will be supported through national funding systems supporting bi-national science programs.

3.5 Will this activity be linked with other IPY core activities? If yes please specify
BIPOMAC has strong links with the projects coordinated within the following IPY core activities:
EoI# 20 PLATES & GATES
EoI# 125 Permafrost Studies
EoI# 183 Arctic Palaeoclimate and its Extremes (APEX)
EoI# 203 International Partnerships in Ice-Core-Science-International Year Initiative (IPICS-IPY)

The links will be used to (1) coordinate logistic requirements, (2) organize joint workshops on specific topics, (3) stimulate joint publications among land/ocean/ice and modelling groups and (4) develop a joint “Paleoclimate Education & Outreach program”.

3.6 How will the activity manage its data? Is there a viable plan and which data management organisations/structures will be involved?
BIPOMAC data will be made public available through the information system, PANGAEA, which is operated by the ICSU World Data Center for Marine Environmental Sciences (WDC-MARE). Data generated within BIPOMAC programs will be stored within the PANGAEA databank so they are widely available, and easily collated and exchanged. Such management of the data generated within the BIPOMAC network will require financial support, and this will be sought through the individual projects and projects groups.
A list of data submitted to the data bank and the location of sample repositories will be provided to all participants on the BIPOMAC website.

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 projects within BIPOMAC will involve a larger number of undergraduate and postgraduate students in their different stages of marine, ice and land expeditions, data and sample acquisition and their analysis, interpretation and modelling. Attractive projects at the frontline of science combined with the exploration of our planets frontiers will contribute to developing the next generation of polar scientist. This will accompanied with education and outreach programs (see 3.9).

3.9 How will this activity address education, outreach and communication issues outlined in the Framework document?
Education: Expeditions within BIPOMAC will provide field training for both university graduate students and undergraduates, including the training of indigenous students from communities living in the Arctic realm (e.g. Nunavut High School students, Canada). These students will receive intense exposure to the ideas and operations of interdisciplinary Earth system science. In addition, BIPOMAC scientists will contribute to student summer schools (e.g. AITI, EoI#260; STUDEX EoI#311) and give open lectures at universities, and secondary schools.

Outreach and communication: BIPOMAC expeditions will be open to the participation of television teams and journalists. Internet contact between researchers in the field and schools and journalists will also be set up.

BIPOMAC supports the establishment and implementation of a "Paleoclimate education & outreach program" together with other paleoclimate IPY core projects (e.g. EoI#20, EoI#125, EoI#183, EoI#203). This could also include the establishment of further nationally and internationally travelling exhibits, as this has been developed by the Canadian Museum of Nature ("Ice Age Mammals", "Sila"). Such plans should be achieved in close communication with large IPY education initiatives, such as the Center for Polar Education and Communication (EoI#468), University of the Arctic (EoI#415), SVALBASE (EoI#597) and the Antarctic Institute (EoI#405)

3.10 What are the proposed sources of funding for this activity?
The logistical requirements (research vessels, land expeditions, transportations, field stations etc.) and portions of the equipment and scientific and technical personnel for the collection, analysis and storing of samples and data as well as the data management and the management of the IPY core projects are going to be funded through national research programs and institutions as well as international (e.g. ESF, Framework Programmes of European Commission) and national funding agencies or research ministries.
A number of expeditions with the ships the RV Polarstern, RRS James Clark Ross RV and N.B. Palmer, have been scheduled into the long-term schedules drawn up by the organizations overseeing the ships' operations. Expeditions with Rvs Italica, Hesperides, Sonne, Marion Dufresne, CCGS Amundsen and US Coast Guard icebreakers are currently in the planning stages and/or proposals for expeditions have been submitted to the relevant national funding agencies. The portions of ANDRILL included in BIPOMAC have been funded through an international consortium including NSF. The recovery and study of El´gygytgyn lake sediments is supported by the International Continental Drilling Program (ICDP).

3.11 Additional Comments
BIPOMAC is an innovative, multidisciplinary, and internationally-coordinated network of polar research in both hemispheres. BIPOMAC focuses on the interplay of northern and southern polar processes in driving and amplifying global climate as recorded in high-resolution (Pliocene-Holocene) marine and terrestrial records. It will provide the pulse of information urgently needed to come to a better understanding of global climate and to realistic prognoses of future climate and sea level in a world significantly affected by global change.

4.0 CONSORTIUM INFORMATION

4.1 Contact Details

Lead Contact
Dr Rainer Gersonde
Alfred Wegener Institute for Polar and Marine Research
Postbox 12 01 61 Bremerhaven
27515
Germany

Tel: +49-(0)471-4831-1203
Mobile: No
Fax: +49-(0)471-4831-1923
Email: rgersonde@awi-bremerhaven.de

Second Contact
Dr Robert Dunbar

Stanford University, Department of Geological and Environmental Sciences
Stanford, CA
94305
USA

Tel: 650-725-6830
Mobile: No
Fax: 650-799-8708
Email: dunbar@stanford.edu

4.2 Other significant consortium members and their affiliation

Name	Organisation	Country
Charlotte Bryant	Department of Chemistry, University La Sapienza, Rome	UK
Julie Brigham-Grette	University of Massachusetts, Amherst	USA
Dimitri Y Bolshiyanov	Arctic and Antarctic Research Institute, St Petersburg	Russia
Achim A Beylich	NGU, Trondheim	Norway
Mike Bentley	University of Durham, Department of Geography	UK
Ole Bennike	Geological Survey of Denmark and Greenland	Denmark
Simon Belt	School of Earth, Ocean and Environmental Sciences, University of Plymouth	UK
Yves Begin	Centre d'Etudes Nordiques, universite Laval, Quebec	Canada
A.I. Bedritskiy	Roshydromet	Russia
H. Bauch	Akademie Mainz/IFM-GEOMAR Kiel	Germany
Timothy Barrows	Nuclear Physics Department, Australian National University	Australia
Peter Barrett	Victoria University of Wellington	New Zealand
Carlo Baroni	Universita di Pisa	Italy
Greg Balco	University of Washington	USA
Nigel Atkinson	EAS, University of Alberta	Canada
Robert Anderson	Lamont-Doherty Earth Observatory	USA
Will Ambrose	Bates College	USA
Claire Allen	British Antarctic Survey	UK
Michel Allard	Centre d'Etudes Nordiques, Universite Laval, Quebec	Canada
Stefano Aliani	S.Mar - Physical Oceanography Section of La Spezia	Italy
Ala, Aldahan	Geocentrum, Uppsala University	Sweden
A, Ahlberg	Lund University	Sweden
Andrea Abelmann,	Alfred-Wegener-Institute for Polar and Marine research	Germany
Angelo Camerlenghi	GRC Geosciences Marines, Universitat Barcelona	Spain
Miquel Canals	GRC Geosciences Marines, Universitat Barcelona	Spain
Lucilla Capotondi	I.S. Mar - Marine Geology Section of Bologna	Italy
JoLynn Carroll	Polarmiljosenteret, Tromso	Norway
Hanne Christiansen	University Centre on Svalbard	Norway
Lisa Clough	East Carolina University	USA
Cesare Corselli	Department of Geology, University of Milan	Italy
Xavier Crosta	University Bordeaux	France
Robert DeConton	University of Massachusetts	USA
Christina De La Rocha	Alfred-Wegener-Institute for Polar and Marine Research	Germany
Laura DeSantis	Istituto Nazionale OGS, Trieste	Italy

Anne De Vernal	Montreal University	Canada
Bernhard Diekmann	Alfred-Wegener-Institute for Polar and Marine Research	Germany
Eugene W. Domack	Department of Geology & Environmental Studies, Hamilton College, New York State	USA
A.S. Dyke	Geological Survey of Canada	Canada
John England	University of Alberta, Department of Earth and Atmospheric Sciences (EAS), Edmonton	Canada
Tanya Ertunc	NERC Radiocarbon Laboratory, East Kilbride	UK
Carlota Escutia	University of Grenada	Spain
Oliver Esper	Alfred-Wegener-Institute for Polar and Marine Research	Germany
Samuel Etienne	Laboratory of Physical Geography, University of Clermont-Ferrand	France
Bernd Etzelmuller	Institute of Geosciences, Department of Physical Geography, University of Oslo	Norway
Hubertus Fischer	Alferd-Wegener-Institute for Polar and Marine Research	Germany
Jose-Abel Flores	University of Salamanca	Spain
Fabio Florindo	Instituto Nazionale di Geofisica e Vulcanologia	Italy
Martin Frank	IFM/GEOMAR Kiel	Germany
Daniel Fortier	Centre d'Etudes Nordiques, Universite Laval, Quebec	Canada
Richard Fortier	Centre d'Etudes Nordiques, Universite Laval, Quebec	Canada
Jane Francis	University of Leeds	UK
Luca Gasperini	I.S. Mar - Marine Geology Section of Bologna	Italy
Federico Giglio	I.S. Mar - Marine Geology Section of Bologna	Italy
A.F. Glazovskiy	Institute of Geography, Russian Academy of Sciences	Russia
Karsten Gohl	Alfred-Wegener-Institute for Polar and Marine Research	Germany
Steve Goldstein	Lamont-Doherty Earth Observatory	USA
H. Grobe	Alfred-Wegener-Institute for Polar and Marine Research	Germany
Tom Guilderson	Lawrence Livermore National Laboratory, University of California	USA
Brenda Hall	Climate Change Institute, University of Maine	USA
C.R. Harington	Canadian Museum of Nature, Ottawa	Canada
David Harwood	University of Nebraska, Lincoln	USA
Alan Haywood	British Antarctic Survey	UK
Hartmut Hellmer	Alferd-Wegener-Institute for Polar and Marine Research	Germany
Gideon Henderson	University of Oxford	UK
Chris Hendy	University of Waikato	New Zealand
A. Hermann	Russian Academy of Sciences, Moscow	Russia
Claude Hillaire-Marcel	GEOTOP-UQAM	Canada
Claus-Dieter Hillenbrand	British Antarctic Survey	UK
Richard Hindmarsh	British Antarctic Survey	UK
Berit Hjelstuen	Department of Earth Science, University of Bergen	Norway
Rus Hoelzel	University of Durham	UK
Anne Hormes	Angstrom Laboratory, Uppsala University	Sweden
Hans-Wolfgang Hubberten	Alfred-Wegener-Institute for Polar and Marine Research	Germany
P. Huybrechts	Alfred-Wegener-Institute for Polar and Marine Research	Germany

Jukka Kayhko	Department of Geography, University of Turku	Finland
Michaele Kashgarian	Lawrence Livermore National Laboratory, University of California	USA
Darrell Kaufman	Department of Geology, Northern Arizona University	USA
Meredith Kelly	Lamont-Doherty-Earth Observatory	USA
Nalan Koc	Tromsoe University	Norway
Paul Koch	University of California, Santa Cruz	USA
Jack Kohler	Norsk Polarinstitutt	Norway
Gerhard Kuhn	Alfred-Wegener-Institute for Polar and Marine Research	Germany
M. Kuhn	Institute of Meteorology and Geophysics, University Innsbruck	Austria
Natalia Kukina	P.P. Shirshov Institute of Oceanology of Russian Academy of sciences (IORAS)	Russia
Viktor Kunitzki	Russian Academy of Science Permafrost Institute	Russia
Tatyana Kuznetsova	Moscow State University, Geological Faculty	Russia
M. Larsen	GEUS, Copenhagen	Denmark
Rob Larter	British Antarctic Survey	UK
Claude Lavoie	Centre d'Etudes Nordiques, Universite Laval, Quebec	Canada
Martin Lavoie	Centre d'Etudes Nordiques, Universite Laval, Quebec	Canada
Frank Lehmkuhl	Rheinisch-Westfaelische Technische Hochschule (RWTH), Geography Department, Aachen	Germany
Alla Yu Lein	P.P. Shirshov Institute of Oceanology of Russian Academy of Sciences	Russia
Amy Leventer	Colgate University, Hamilton	USA
Gerrit Lohmann	Alfred-Wegener-Institute for Polar and Marine Research	Germany
Antonio Longinelli	Department of Geochemistry, University of Parma	Italy
V.N. Lukashin	P.P Shirshov Institute of Oceanology of Russian Academy of Sciences	Russia
Wojciech Majewski	Institute of Paleobiology, Polish Academy of Sciences	Poland
Elisa Malinverno	Department of Geology, University of Milan	Italy
Guillaume Masse	University of Plymouth	UK
Andrew McMinn	Institute of Antarctic and Southern Ocean Studies (IASOS)	
Martin Melles	University Leipzig, Institute fro Geophysics and Geology	Germany
Roberto Meloni	S. Mar- Physical Oceanography Section of La Spezia	Italy
Gifford Miller	University of Colorado, Boulder	USA
Pavel Minyuk	NEISRI FEB-RAS	Russia
Steve Moreton	NERC Radiocarbon Laboratory, East Kilbride	UK
Robert Mott	Geological Survey of Canada	Canada
Tim Naish	Institute of Geological and Nuclear Sciences, Loer Hutt	New Zealand
Inna A Nemirovskaya	P.P.Shirshov Institute of Oceanology of Russian Academy of Sciences	Russia
Frank Niessen	Alfred-Wegener-Institute for Polar and Marine Research	Germany
Ulysses Ninnemann	Bergen University	Norway
Matt Nolan	University of Alaska Fairbanks (UAF)	USA
A.N. Novigatsky	P.P.Shirshov Institute of Oceanology of Russian Academy of Sciences	Russia
Dirk Nurnberg	IFM/GEOMAR, Kiel	Germany

Serge Payette	Centre d'Etudes Nordiques, Universite Laval, Quebec	Canada
Emilien Pelletier	ISMER-UQAR	Canada
Lyudmila A. Pestryakova	Ammosov Yakutsk State University, Department of Ecology	Russia
Bianca Maria Petronio	Department of Chemistry, University La Sapenza, Rome	Italy
Eva-Maria Pfeiffer	University Hamburg, Institute of Soil Science	Germany
Marco Pietroletti	Department of Chemistry, University La Sapienza, Rome	Italy
David Piper	Geological Survey of Canada, Bedford Institute of Oceanography, Dartmouth, Nova Scotia	Canada
E.I. Polyakova	Moscow State University	Russia
Goran Possnert	Angstrom Laboratory, Uppsala University	Sweden
Michel Poulin	Canadian Museum of Nature	Canada
Ross Powell	Northern Illinois University, Department of Geology and Environmental Geosciences	USA
Daniel Praeg	Instituto Nazionale di Oceanografica e Geofisica Sperimentale, Triest	Italy
Andreij V Propopiev	Siberian Branch of the Russian Academy of Sciences	Russia
Li Qiang	Institute of Vertebrate Paleontology and Paleoanthropology, Beijing	China
Volker Rachold	Alfred-Wegener-Institute	Germany
Mariangela Ravaioli	I.S. Mar - Marine Geology Section of Bologna	Italy
Dominique Raynaud	Lab. De Glaciologie et Geophysique de l'Environment, CNRS	France
Michele Rebesco	Istituto Nazionale OGS, Trieste	Italy
Paula Reimer	Lawrence Livermore National Laboratory, University of California	USA
Mike Retelle	Bates College	USA
A. Richter	Institute of Natural Conservation and Ecology, University Vienna	Austria
Andre Rochon	ISMER-UQAR	Canada
Steven Roof	School of Natural Science, Hampshire College. Amherst	USA
Steve Rowland	University of Plymouth	UK
A.E. Rybalko	SEVMORGEO	Russia
Natalia Rybczynski	Canadian Museum of Nature, Ottawa	Canada
Iorsteinn Saemundsson	Natural Research Centre for North-Western Iceland	Iceland
Guillaume St-Onge	Universite du Quebec, Rimouski	Canada
H Sandhager	Alfred-Wegener_Institute for Polar and Marine Research	Germany
M Schardt	Institute of Digital Image Processing, Remote Joanneum Research	Austria
Frank Schabitz	Koln University	Germany
Hans-Werner Schenke	Alfred-Wegener-Institute for Polar and Marine Research	Germany
Lutz Schirrmeister	Alfred-Wegener-Institute for Polar and Marine Research	Germany
Andreas Schmittner	College of Oceanic and Atmospheric Sciences, Oregon State University	USA
Wolfgang Schoner	Vienna	Austria
Marian Scott	Department of Statistics, University of Glasgow	UK
Hans-Peter Sejrup	University of Bergen	Norway
Rainer Sieger	Alfred-Wegener-Institute for Polar and Marine Research	Germany
Patrick Shannon	Department of Geology, University College Dublin	Ireland

A.I. Sharov	Institute of Digital Image Processing, Remote Joanneum Research	Austria
Aldo Shemesh	Weitzman Institute, Rehovot	Israel
Vladimir P. Shevchenko	P.P.Shirshov Institute of Oceanology of Russian Academy of Sciences	Russia
Martin Siegert	University of Bristol	UK
Viktor Smetacek	Alfred-Wegener-Institute for Polar and Marine Research	Germany
Sarah Spaulding		UK
Valentin Spekor	RAS Melnikov Permafrost Institute Yakutsk	Russia
R. Spicer	CEPSAR Open University	UK
Robert Spielhagen	Akademie Mainz/IFM-GEOMAR Kiel	Germany
Rudiger Stein	Alfred-Wegener-Institute for Polar and Marine Research	Germany
Martyn Stoker	British Geological Survey	UK
Joseph S. Stoner	Oregon State University	USA
J. Strobl	Centre for Geoinformatics, Salzburg University	Austria
Dmitry A. Subetto	RAS Institute of Limnology, St Petersburg	Russia
Witold Szczucinski	Institute of Geology, Adam Mickiewicz University, Poznan	Poland
E.E. Taldenkova	Moscow State University	Russia
Sergei Tambiev	P.P. Shirshov Institute of Oceanology of Russian Academy of Sciences	Russia
Pavel Tarasov	Freie Universitat Berlin, Inst. Of Geoscience	Germany
Ralf Tiedemann	Alfred-Wegener-Institute for Polar and Marine Research	Germany
Axel Timmermann	IPRC, SOEST, University of Hawaii	USA
Roger Urgueles	GRC Geosciences Marines, Universitat Madrid	Spain
Gabriele Uenzelmann-Neben	Alfred-Wegener-Institute for Polar and Marine Research	Germany
Tilo Von Dobeneck	FB Geowissenschaften, University Bremen	Germany
Hilmar Von Eynatten	University Gottingen	Germany
Pinxiang Wang	Department of Marine Geology and Geophysics, Tongji University, Shanghai	China
X Wang	Natural History Museum of Los Angeles County	USA
Al Werner	Mount Holyoke College	USA
Eske Willerslev	Copenhagen University	Denmark
Gary Wilson	University of Otago, Department of Geology	New Zealand
S. Wing	Smithsonian Institution	USA
Anrzej Wittkowski	Stettin University	USA
Alexander Wolfe	The University Ventre Svalbard	Norway
Sheng Xu	NERC Radiocarbon Laboratory, East Kilbride	UK
Marek Zajaczkowski	Institute of Oceanology Polish Academy of Sciences	Poland
Viktoria V. Zernova	P.P. Shirshov Institute of Oceanology of Russian Academy of Sciences	Russia
Qui Zuding	Institute of Vertebrate Paleontology and Paleoanthropology, Beijing	China
B. Zolitzschka	University Bremen	Germany