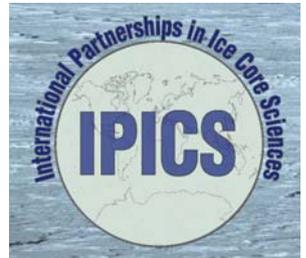


International Partnerships in Ice Core Sciences (IPICS)
2008 Steering Committee meeting
19-20 April 2008, Vienna



Agenda and meeting notes

Meeting agenda

Saturday April 19

09:00-09:30 Introduction and current status of IPICS (Brook)

Morning chaired by Ed Brook

09:30-10:30 NEEM status and plans (Popp plus discussion)

10:30-10:50 Break

10:50-12:20 Oldest Ice science and implementation plan (introduced by Severinghaus)

science goals
site selection criteria
drilling consortia
apportioning inputs and outputs

12:20-13:30 Lunch

Afternoon chaired by Eric Wolff

13:30-14:30 40 k plan (introduced by Fischer)

science goals
essential measurements
sites still required
opening up sites to extra participants
coordination and synthesis

14:30-15:30 2 k plan (introduced by van Ommen)

science goals
essential measurements
coordination and synthesis

15:30-15:50 Break

15:50-17:20 Drilling and infrastructure (Wilhelms)

technological barriers re drilling at cold remote sites
easily deployable drills for networks
sharing of technology and drills
logging tools
best practice in ice core storage, archiving, processing

Additional items discussed: training and personnel exchange, media, possible new projects, data.

Dinner, sponsored by SCAR funds, held at Augustinerkeller.

Sunday April 20

09:00-09:15 Logistics, funding and commitments (for each project) (Brook)

identify recent progress
identify probable sources of funding and logistics

*identify actions needed to secure support
national expressions of interest
identify next steps and task specific subgroup to take the
next steps*

Chair: Brook

09:15-10:30

Logistic issues, funding and commitments for oldest ice (led by Wolff)

10:30-11:00

Break

11:00-12:00

Logistic issues, funding and commitments for 40 ka (led by Brook)

12:00-13:00

Lunch

Chair: Wolff

13:00-14:00

Logistic issues, funding and commitments for 2 ka (led by van Ommen)

14:00-15:00

Next steps on technical issues, plus future engagement with logistics and funders

15:00-15:30

Future of IPICS (Wolff)

confirm/elect chairs

agree future meetings

financial support for IPICS meetings

possible additional projects

Meeting actually ended at ~15.00.

Attendees

Tas van Ommen	Australian Antarctic Division	Australia
Li Yuansheng (day 2)	PRIC	China
Trevor Popp*	University of Copenhagen (for Dahl-Jensen)	Denmark
Rein Vaikmäe	Tallinn University of Technology	Estonia
Jérôme Chappellaz	Laboratoire de Glaciologie (LGGE), France	France/PAGES
Amaelle Landais*	IPSL-LSCE (for Masson-Delmotte)	France
Dominique Raynaud*	LGGE	France
Hubertus Fischer	Alfred-Wegener-Institute	Germany
Heinz Miller	AWI	Germany
Frank Wilhelms	AWI	Germany
Massimo Frezzotti	ENEA-PNRA	Italy
Valter Maggi*	University of Milan-Bicocca	Italy
Nobuhiko Azuma	Nagaoka University of Technology	Japan
Kumiko Goto-Azuma*	National Institute of Polar Research	Japan/IACS
Kenji Kawamura*	National Institute of Polar Research	Japan
Hideaki Motoyama*	National Institute of Polar Research	Japan
Sungmin Hong	Korea Polar Research Institute	Korea
Soon Do Hur*	Korea Polar Research Institute	Korea
Hinrich Schaefer*	currently at LGGE (for Bertler)	New Zealand
Elisabeth Isaksson	Norwegian Polar Institute	Norway
Vladimir Lipenkov	AARI, St. Petersburg	Russia
Margareta Hansson	Stockholm University	Sweden
Thomas Stocker	University of Bern	Switzerland
Eric Wolff	British Antarctic Survey	UK
Charlie Bentley*	Ice Coring and Drilling Services: University of Wisconsin - Madison	USA
Ed Brook	Oregon State University	USA
Eric Saltzman*	University of California, Irvine	USA
Jeff Severinghaus	Scripps Institution of Oceanography	USA
Jim White	INSTAAR	USA

Apologies received from:

Jean Louis Tison	Belgium
Jefferson Simoes	Brazil
David Fisher	Canada
Thamban Meloth*	India
Rasik Ravindra	India
Roderik van de Wal	Netherlands

whose nations were not represented
and other SC and non-SC invitees

Non-SC members are marked with an asterisk (*).

Meeting notes

The meeting opened with everyone introducing themselves and stating who they were representing on the SC. There were 29 attendees. Some apologies (including last minute ones due to visa or health problems) were presented.

Ed Brook, presented the history of IPICS and its mission, and summarised the 4 white papers (supporting documents on IPICS web site now at <http://www.pages-igbp.org/ipics/index.html>). The goals for this meeting are to have science and implementation/coordination plans for the next 3 projects (beyond NEEM) endorsed, and to establish groups to pursue them. Ed thanked PAGES and SCAR, who have both provided funds to support travel for some attendees, and BAS, who paid for the meeting room. National reports and draft white papers had been circulated in advance, and final versions would be posted on the web site.

NEEM: Trevor Popp presented the NEEM project, which is now running. Extra information is in the Danish national report. The hope is to drill to up to 400 m in 2008, and to warm ice at 2450 m or the bed at 2560 m in 2010, closing the camp in 2011. Processing would be in the field from 2009. Funding is strong, with a long list of countries firmly committed, although the increased cost of fuel calls for extra funds. There should be a full science plan by autumn 2008 for an SC meeting in November. The new drill liquid ESTISOL240 with COASOL would be used: this has advantages and disadvantages (eg high viscosity, slippery).

Training: At this point there was a discussion about training and exchange of personnel (especially drillers). This is listed as an area for work in our mission statement. It was agreed there should be pressure on funding agencies to facilitate the exchange of students. But especially we should make sure that we are aware of cases where expertise in drilling exists in one nation or group, and is needed in another, and better match our capacity to our needs. The information exchange in IPICS should improve the possibilities for this. It would be highly desirable to have a summer school or similar training in ice core studies, and IPICS would support any initiative to arrange such a thing (but has no resources to do it itself). At a practical level it was recommended that students from other projects (not just senior personnel) should be invited to meetings such as EPICA and WAIS.

Media: All groups get a lot of media requests. While there is no substitute for local interviewees in each nation, it would save time if we had a pool of video material, available without copyright issues. People with such material should make it available to all if possible (issue for putative web site).

Oldest ice: Jeff Severinghaus presented the science and outline implementation plan (SOIP). The major steps in site selection were discussed individually, and the idea that the site selection should lead to the formation of two or more consortia was agreed. The possible use of blue ice or discontinuous cores was also discussed but considered only to be a last resort if no site for continuous drilling could be found. The meeting agreed without dissent to adopt the SOIP after minor changes to be made by the oldest ice group (see later). The main changes were (a) to refer to needing “at least 2 cores”, (b) to allow more room for extra iterations around the survey/modelling part, and (c) to emphasise that the ideas about inputs and outputs should be considered

as exemplars, and that if detailed rules are required these should be negotiated with and between national agencies once the real activities become clearer.

40K: Hubertus Fischer presented the science and coordination plan (SCP). There was some discussion about how to synchronise records, and the importance for example of coordinating the efficient use of ^{10}Be . Required elements for 40K projects were discussed, including characteristics of stable isotope, ion chemistry, dust, DEP, ECM, sulphate, and gas records (methane, air content, $\delta^{18}\text{O}_{\text{atm}}$). There was discussion of how to make the most of the cores that reach the last interglacial (discussed again later). The link to other communities covering the same period can be made through PAGES and the contact to the marine and GCM community should be sought after where needed. Different possible sites for 40K were discussed, including the need to assess the re-drilling of some existing sites that do not meet the needs of 40k. Finally, the need for a snappier name was agreed. With a few minor edits to be made by the 40k group, this plan was adopted without dissent.

2k: Tas van Ommen presented the science and coordination plan (SCP), pointing out that the effort to write it, led by Eric Steig, had been more recent than with other plans, so some issues were not yet fixed. There was discussion of including biogeochemical cycles as an aim of the project. The list of mandatory measurements should be kept reasonably small, and sites not reaching 2000 years should be accepted. It was agreed that wording regarding the Little Ice Age and Medieval Warm Period should be changed to encompass this scale of variability in general rather than these specific “events.” However, sites needed to have sufficient resolution to give annual calibration data where possible (a phrase that should be used in the plan). In regions where such data would never be available, lower standards could be accepted, but the ability to tie cores precisely via volcanic peaks was essential. Making archive available to others where possible, and drilling sites that were in danger of melting were both discussed. Involvement of climate modellers and statisticians with expertise from related fields was desirable, but we should not include any one individual on the sub-group. With a number of amendments to be made by the 2k group, this plan was adopted without dissent.

Technology: Frank Wilhelms led us through a series of issues. The most obvious issue for drilling at cold sites is the drill fluid. We do not currently have one that is available other than butyl acetate, which is unacceptable to some teams. There could be some solutions (such as using a wider hole, or unbalanced drilling) for a more viscous fluid, but we should continue to seek a new fluid, perhaps with help from a chemicals company or consultant. Other issues, for example whether large aircraft are essential, were discussed; there was a feeling among many that a traverse would be the main means of access to likely oldest ice sites. The need for adequate processing labs and some storage at -50°C was emphasised. The network projects require lightweight drills, and some are now available. There could be a better information share to allow the right drills and drillers to be used to fill gaps in equipment and expertise in other projects. Finally possibilities for rapid access drilling to test oldest ice sites before committing to the full deep drilling were discussed: it would be necessary to assess whether it was cost-effective to insert such a step at a later date.

On the second day, logistics, funding and commitment aspects of each project were discussed.

Oldest ice

Eric Wolff reprised what had been decided the previous day. Li Yuansheng and Vladimir Lipenkov presented recent Chinese and Russian respectively actions and plans. China has set up camp at 7 km from Dome A, at a site with 3132 m ice thickness. They plan to drill a pilot hole (350-500 m) in 2009/10, and deep drilling to reach the bed by 2013/14. A local radar survey has been extended this season. There is no decision yet on which drill to use. Russia has been surveying the northern part of Lake Vostok and estimates a possible ice age of 1.2 Ma for the melting ice at a site 4078 m deep.

To assess what has already been done or planned, the work done by the Japan-Swedish, and US-Norwegian traverses (see national reports) as well as the DoCo German flights linking domes was discussed. With the ICECAP and AGAP airborne work that is planned, a substantial part of the search area for oldest ice would be covered. At least some of the accumulation rate cores were also done or planned, but a programme to do more is needed.

It was recognised that there could be 5 groupings that might aspire to lead consortia to drill one of the (at least two) oldest ice cores. It was agreed that the correct course for now is to allow all to continue to study the options, assuming that only some of them would find a good site and be capable of putting in place finance and logistics. However, the groups should aim to be open and inclusive, to attain the best consortia for the job in the final stages. Australian, Chinese, European, and American groups expressed preliminary interest in leadership or major partnership in an oldest ice project. A tentative schedule was discussed for illustrative purposes, extending through 2017.

It was agreed to set up an IPICS oldest ice SC to pursue this project. Their tasks would be to

- engage with the geophysicists to assemble survey data
- assemble existing data from shallow cores and identify future already planned shallow cores.
- identify a way of getting more shallow cores for accumulation
- engage with ice modellers to do further modelling of the age of ice at depth in east Antarctica, make a first assessment of candidate sites (based on the surveys mentioned above); some of this could involve a workshop or challenge program.
- prepare cost estimates for likely sites
- assess how to do the drillings cost-effectively
- engage with the technology group, especially to ensure development of drill fluids.

The oldest ice SC will be:

Eric Wolff, Li Yuansheng, Hideaki Motoyama, Jeff Severinghaus, Tas van Ommen.

40k

Ed Brook reviewed recent progress (including the availability now or soon of NEEM, WAIS Divide, Berkner, James Ross Island, Talos Dome, Law Dome). There were also emerging plans, in various stages of preparation, to drill Roosevelt Island, Taylor Dome (repeat), Renland, Dome A, Neumayer hinterland, south Antarctic Peninsula domes, and a new site on the French D-line. The South Pole and Hercules Dome were noted as other possibilities. The need to stimulate further work in the Candian Arctic was also discussed. Among nations not previously involved at this timespan, South Korea and India also expressed an interest. Effective use of available drills and drillers was important for this project. It was assumed that the project should have an end date around 2013-2015.

The next steps that should be taken are:

- Synthesis of existing records (journal article within a year?)
- Identify new targets and responsible groupings
- Timetable for drilling
- Find a more descriptive project name
- If possible identify funds or people to do synthesis work
- Involve climate and ice sheet modelling community

The 40K SC will be:

Hubertus Fischer, Ed Brook, Robert Mulvaney, Valter Maggi, Jérôme Chappellaz, Thomas Stocker, David Fisher, Dorthe Dahl-Jensen (or delegate). The last two have still to be approached to join the group.

2k

Tas van Ommen summarised what was discussed the previous day. He felt that there were rather few cores already existing that really meet the 2k criteria. However, the aim must be to get the best available data, not perfect data that would eliminate all sites.

The next steps to be taken by the 2k SC are:

- Finalise the science and coordination plan
- Assemble and summarise what is already available
- Lay out further desirable sites or regions
- Set out criteria for 2k data formats if necessary
- If possible identify funds or people to do synthesis work

The 2k SC (not all asked yet) will be:

Eric Steig, Tas van Ommen (or colleague), Massimo Frezzotti, Valerie Masson-Delmotte, Heinz Miller, Hou Shugui. (note added after meeting: Bo Vinther has also been proposed as a member of this group, agreed by Steig, van Ommen and the IPICS co-chairs).

Technology

The various items discussed in the previous drill/technology discussion require international effort. Frank Wilhelms was asked to lead a technical group, with email discussion, but also the possibility to meet again.

Last interglacial

It was felt wise to keep to only 4 active IPICS projects. However it was recognised that the last interglacial (LIG) is an important period and will be a focus for other groups such as PMIP and PAGES. IPICS will have information from NEEM, EPICA and Dome Fuji, and perhaps WAIS and some coastal domes in the 40k project. It was agreed to investigate the possibility of revising NEEM into a wider LIG project, if this would not cause problems to the existing NEEM project. A small team will investigate this:

Ed Brook, Jim White, Jérôme Chappellaz, Dorthe Dahl-Jensen (to be asked).

Other issues

The need for good databases for 40k and 2k especially was agreed. There were two issues: depositing data (our responsibility) and curating it in a way that it could be accessed both within IPICS and outside (data centre responsibility). Both Boulder WDC and Pangaea would be good options, and should be explored once the requirement has been clearly defined especially by the 2k group.

The need for more ice in important parts of cores, and especially in the deepest parts of oldest ice cores, was recognised and will be highlighted to agencies, although the possible solutions (replicate coring, additional cores, large diameter cores) will not be prescribed.

IPICS needs to start dealing with logistics and funding agencies. As a first step, Heinz Miller agreed to make a presentation to COMNAP in St Petersburg (others to supply material).

IPICS future

It was agreed to formalise the need to elect chairs every 4 years, and to ask national groups to confirm their delegates at the same interval. Eric Wolff and Ed Brook will stay on (with 2 years of their 4 completed). They will prepare a short written constitution to add to the mission statement.

It was agreed to hold the next IPICS meeting attached to the PAGES OSM in Corvallis, Oregon in July 2009. The OSM will be July 8-11. A short (half-day) IPICS SC meeting could be held within this, but it would also make sense to have science workshops associated with each project, and this could be done in the period 6-7 July. Jérôme Chappellaz is on the OSM committee and will propose a special session for 40k (not confined to ice cores). Ed Brook will investigate venue and details for the IPICS SC and science workshops. Funding could be requested from NSF and EPB.