

**Arctic Ocean Sciences Board  
International Arctic Polynya Programme  
Scientific Coordinating Group (IAPP-SCG)**

Meeting of 7 March 1999  
Ventura, California

In attendance were: Jody Deming (USA), Linda Duguay (USA/NSF), Louis Fortier (Canada), Hans-Jürgen Hirche (Germany), Louis Legendre (Chair, Canada), Cara Sucher (USGCRP)

## **I. North Water Polynya Project (NOW)**

### **A. Activities to Date**

Dr. Louis Fortier reviewed the history and progress of the NOW project. Many plans had been discussed on how to study the North Water. The original plan was to freeze a large ship or barge in the Cary Island area and have a smaller icebreaker working from there. This plan could not be implemented because of cost. Instead, expeditions on board Canadian icebreakers were conducted in August 1997 and from April through July 1998, with an additional cruise being planned from late August through October 1999. Simultaneously, an extensive network of sediment traps and moorings (w/ ADCP's) were deployed in August 1997 and recovered and re-deployed in July 1998, and will be finally recovered in September 1999.

Information at 9 different NOW sites was recorded during the 1997-1998 winter. The data collected was used to determine the timing of the NOW polynya's formation. At the time of mooring deployment, in August 1997, data were collected on the biology, chemistry and physics of the polynya. In the summer of 1998, the CCGS *Radisson* spent 4 months in the NOW polynya, beginning on 7 April. The polynya opened just after the ship arrived, allowing for collection of excellent data for use in physical oceanographic models. The physics and biology of the polynya were followed throughout the summer. DMS was also monitored throughout the field season and linked with the local climate of the polynya.

### **B. Plans for 1999**

The majority of the field work was completed during the 1998 field season. Two legs are planned for the 1999 field season. The first is mostly for instrument recovery and to make rate measurements. The sediment traps have been recording since August 1997 with a brief, 2-week gap in early June 1998. The second cruise is to determine late-season biology.

#### **Future:**

There is still interest in making measurements during the winter months (e.g. February), but this is very difficult logistically. The scientists intend to bring all the NOW information together to start data synthesis. The project was more successful than anticipated, and 100% of the planned fieldwork was completed. Since the program was so successful, there is a possibility the NSERC will fund this sort of project again.

The NOW project is also beginning to get a lot of public attention. An article was recently published in the Canadian magazine "Equinox" and the Japanese NHK made a 1-hour special on

the project, that was viewed by 15 million people in Japan; an English translation is under way, to be sold to foreign networks.

### **Scientific Results:**

The IAPP was initially proposed as a biological project, but linking the physical and biological oceanography has proven to be very beneficial. Before the NOW project began, a theoretical picture of physical and biological processes was formed based on published literature. The data recovered so far fits theoretical ideas very well.

- The NOW polynya is much larger than the NEW polynya (75-80,000 km<sup>2</sup> vs. 45,000 km<sup>2</sup>). There are SSM/I satellite records of the NOW polynya since 1979. These show a lot of inter-annual variability over the last 25 years, but in only 2 or 3 instances where no polynya was formed, because of the lack of an ice-bridge north of the polynya in these years. The ice-bridge is the weakest point of the entire system, and with warming it may not form.
- The NOW polynya is a mixed polynya - affected by both latent and sensible heat. The early biology on the Greenland side of the polynya is likely linked to sensible heat melting of the ice cover.
- Sustained productivity was seen for 6-7 months.
- Warming that was predicted to occur 50 years in the future is being observed presently.
- A high latitude bloom in Kane Basin was seen in 1997. Perhaps this is an indication of an unexpected northern input of nutrients as well as the known southern input.

### **C. Overall Conclusions:**

- The NOW program was extremely successful.
- Information learned from the NEW project enhanced the success of NOW.
- The NOW project has helped scientists get a good grasp of climate change effects on polynyas
- Many new interdisciplinary questions have come out of the project
- Other points
  - There was much networking between groups and programs.
  - The Canadian Coast Guard did an excellent job.
  - International relations were excellent.

## **II. IAPP Workshop or Symposium?**

### **A. Scope of an IAPP Meeting**

The IAPP-SCG feels that a large polynya meeting is very important. Different possibilities for this meeting include just NOW participants, a NEW/NOW meeting to compare linkages and a NOW/NEW/Ross Sea meeting. The SCG decided that a large meeting bringing together all polynya research would be the most interesting and beneficial. The polynyas being studied presently are all different and would profit from comparisons and discussions.

The NOW project, however, is not quite ready for such a meeting. For this reason, the SCG would like to recommend that the large Polynya Meeting be held in 2001. In the meantime, two 1-day NOW workshops (each with approximately 25 people) will be organized in conjunction with the upcoming Ocean Sciences and ASLO meetings in 2000 where ideas, papers and data

synthesis will be discussed. A special session on polynyas at each of these meetings will also be organized (a special session only on the NOW polynya would most likely attract people only from the NOW project).

### **ASLO/AGU 24-28 January 2000 in San Antonio, TX**

- Jody Deming will propose a polynya special session. The SCG would like the other co-chair(s) to be from another polynya project and from another discipline. Dr. Deming will contact Walker O. Smith for recommendations of a non-biologist from the Ross Sea polynya project.
- Louis Fortier will organize a NOW Workshop associated with this meeting.

### **ASLO June 2000 in Copenhagen, Denmark**

- Louis Legendre will propose a polynya special session. Helge Thompson from Denmark was recommended as a possible co-chair.
- Louis Fortier will organize a NOW Workshop associated with this meeting.

### **Polynya Meeting 2001**

- Open to all polynya studies.
- Would like the meeting to be about 120-150 people.

### **B. Suggested Steering Committee:**

The Steering Committee for the 2001 Polynya Meeting needs to be reflective of all polynya studies including the Ross Sea polynya, Laptev Sea, NEW and NOW as well as representing the many disciplines and countries participating in these projects. Steering Committee members from the NEW and NOW projects will invite people from the other polynya projects to participate on the Steering Committee.

The Chair's responsibilities will include forming the Steering Committee and the Steering Committee's responsibilities will include determining a date and place for the meeting and forming a local organizing committee.

#### Steering Committee Suggestions:

Jody Deming (chair)	US	biological oceanographer	NEW, NOW
Knut Falk	Denmark	orinithologist	NEW, NOW
Louis Fortier	Canada	biological oceanographer	NEW, NOW
Hans-Jürgen Hirche	Germany	biological oceanographer	NEW, ?Laptev
Grant Ingram	Canada	physical oceanographer	NEW, NOW
Peter Minnett	US	physical oceanographer	NEW, NOW
Walker Smith	US	biological oceanographer	NEW, Ross Sea
Doug Wallace	Germany	chemical oceanographer	NEW, NOW

- Hans-Jürgen Hirche will find a representative from the Laptev Sea project to sit on the Polynya Meeting Steering Committee
- Louis Legendre will talk to Mitsuo Fukuchi to find a suitable Japanese representative to sit on the Polynya Meeting Steering Committee

### **C. Suggested Venues and Dates**

Need to have a local organizer willing to put in the planning effort.

- Victoria, BC in June 2001

- Possible local organizer: Eddy Carmack (Jody Deming is close enough to help)
- Excellent convention center in Sidney belonging to the University of Victoria, at reasonable rate
- Close to airport, though flights might be expensive and might limit a lot of the European participation
- Meals and lodging cheaper than Seattle

- Seattle, WA in June 2001

- Possible local organizer: Jody Deming (Eddy Carmack is close enough to help)
- Fairly expensive food, restaurants, flight, lodging

- Miami, FL in Oct/Nov 2001

- Possible local organizer: Sharon Smith, Peter Minnett
- Nice convention center or use the University

- Quebec City, Canada in June 2001

- Possible local organizer: Louis Fortier
- Geographically central to participants

- Williamsburg, VA (VIMS) in early June or October 2001

- Possible local organizer: Walker Smith

- Stonybrook, NY

## **III. IAPP**

### **A. Future of IAPP**

The SCG agreed that the NEW and NOW projects have been so successful that it would be appropriate to continue the IAPP.

Two projects were discussed as the most promising: the Greenland Arctic Shelf Project (GRASP) and an intercomparison of 3 polynyas with different biological activity (NOW, NEW and Laptev Sea).

#### **GRASP**

GRASP is a Danish project with the intent of exploring the geology, biology and physics of the Arctic shelf north of Greenland in the Lincoln Sea polynya area and beyond. The project is partly political as Denmark would like to see what kinds of resources are there.

The upside to participating in this project is the Lincoln Sea area and surrounding waters are the source of water for the NEW and NOW polynyas and would be the next logical step for the IAPP. There is much to learn physically and biologically including information about the source heterotrophs and nutrients. No data on primary productivity has ever been collected in this area either.

The downside of the GRASP project, however, is that it's a very difficult place to access. The sea-ice is upwards of 4m thick. Ice breaker operations and ice camps would be necessary. There will be an expedition up to this area in July/August 1999.

Advertisements on the GRASP project have started coming out, and the project should be up and running by about 2001. It is planned to run for 5-10 years, though the financial aspects are unsure and application for European funding is being considered.

This project is very closely tied to the NEW and NOW projects, so the SCG feels an IAPP label for its polynya component would be logical. The IAPP would work to complement the GRASP project. The question then falls on who would take the lead for the IAPP's contribution to the GRASP project. It was pointed out that it may be difficult for the US to take the lead on the Lincoln Sea project because the lead country needs to have very strong central funding for the project. Since Canada has a polynya network already set up, it might be better to continue with Canada in the lead as they have been for the NOW project. Since the IAPP is an international effort, it was also suggested that the project could have joint leadership between the US, Canada and Denmark. Jody Deming was recommended to lead the establishment of the US portion of the project.

The SCG feels that if the AOSB decides to make this part of the IAPP, then the IAPP needs to proceed as quickly as possible. Jody Deming will try to develop funding interest from NSF by giving a presentation with participation from Louis Fortier, Hans-Jürgen Hirche and a Danish representative of the GRASP project. It is hoped that in the next year-and-a-half parallel proposals from both the US and Canada will be produced for the Lincoln Sea project.

**Recommendation to the AOSB:** The IAPP-SCG feels that there is much enthusiasm from scientists to continue the IAPP into a third stage. A project on the Lincoln Sea to complement the GRASP project is the most logical next step. The US will attempt to take the lead on the third stage, but if this proves too difficult, the IAPP will try to make it a US/Canadian/Danish co-led project.

### **Intercomparison of the NOW, NEW and Laptev Sea Polynyas**

The NEW and NOW polynyas were and are the sites of interdisciplinary studies under the IAPP. The Laptev Sea polynya is presently being studied by Germany from the physical and geological standpoints. The three polynyas appear to offer a gradient from high to low biological productivity. As an initial step towards an intercomparison of the NOW, NEW and Laptev Sea Polynyas, researchers working in the three systems will be invited to the special session on polynyas to be held during the Copenhagen ASLO 2000 meeting.

### **B. Revision of the Terms of Reference**

The IAPP-SCG agreed that the 1991 "Terms of Reference" document needs to be revised. Several of the hypotheses proposed in the document are now tested. In light of the new information learned from the NEW and NOW projects, the objectives also need to be reviewed. It was suggested that a fourth mandate possibly be added, which would specifically address the modeling of polynyas.

Cara Sucher will send electronic copies of the 1991 document to IAPP-SCG members for review. Additions and deletions will be discussed over email and the final revisions will be made at the next IAPP-SCG meeting.

### **C. IAPP-SCG Members**

The AOSB suggested at its last meeting that the IAPP-SCG was not well distributed among disciplines. Countries were asked to send in suggestions for new members, but none came in. The IAPP-SCG came up with some suggestions:

It was generally agreed that it would be good to have some new people on the IAPP-SCG and to have the inactive people leave the committee.

Possible additions:

- Andrew Willmott (Keel University,UK - physical oceanographer)
- Helge Thompson (Denmark)
- Ian Walsh (US, physical oceanographer)
- Mark Johnson (US, physical oceanographer)
- John Andrews (US, geologist)
- Louis Legendre will ask Mitsuo Fukuchi for a recommendation for a Japanese member
- Should there be sedimentologists and paleontologists on the committee?

Possible removals:

- Louis Legendre will ask Preben Gudmansen if he'll be staying on the SCG.
- John Harwood: Has not been very active. Ask if he would like to continue as an SCG member.
- Reinhardt Kristensen: would like to encourage him to stay on SCG if he's affiliated with GRASP.
- Torkel Gissel Nielsen: would like to encourage him to stay on SCG if he's affiliated with GRASP.

## **IV. Other Business**

### **A. AOSB website**

The AOSB website address is [www.aosb.org](http://www.aosb.org). Contact Cara Sucher with any comments, links or additions you would like to see on the IAPP pages.

### **B. Next IAPP-SCG meeting**

The next IAPP-SCG meeting will be held in conjunction with the ASLO/AGU meeting in San Antonio, Texas, USA (24-28 January 2000).