



**NATO SCIENCE PROGRAMME**  
**Cooperative Science and Technology Sub-Programme**  
**ADVANCED STUDY INSTITUTE**  
**ADVANCED RESEARCH WORKSHOP**

NATO Public Diplomacy Division, Science Programme, Bd. Leopold III, B-1110 Brussels, Belgium  
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## GENERAL REPORT

This **General Report** should be submitted to the NATO Scientific Affairs Division within 30 days of the meeting. The **Financial Report** form may be sent later, after consolidation of the accounts, but must be with NATO by no later than 120 days from the end of the meeting. Only after acceptance by NATO of the financial report as well as the present report can any final instalment of the grant be paid.

### 1. Advanced Research Workshop

Title : Joint International Scientific Observation Facility on Jan Mayen Island

Location : Oslo, Norway  
 (site and country)

Dates : 11-15 November 2003  
 Number of working days: 5

### 2. **Co-directors** (Name, address, telephone no., fax and e-mail)

#### i) NATO-country Co-director

Skreslet, Stig  
 Bodoe Regional University, N-8049 Bodoe, Norway  
 Telephone: +47 755 17496  
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Signature :

#### ii) Partner-country Co-director

Birkenmajer, Krzysztof  
 Inst. of Geological Sciences, Polish Academy of Sciences, Senacka 1, 31-002 Krakow, Poland  
 Telephone: +48 12 4228920  
 Fax: +48 12 4221609  
 E-mail: ndbirken@cyf-kr.edu.pl

Signature:

### 3. **Principal members of the Organizing Committee**

(Name, position, address)

Stig Skreslet, NATO-Country Co-Director, Bodø Regional University, Bodø, Norway  
 Krzysztof Birkenmajer, Partner-Country Co-Director, Polish Academy of Sciences, Krakow, Poland  
 Vladimir Byshev, Member, P.P. Shirshov Inst. of Oceanology, Moscow, Russia  
 Jens Meincke, Member, Institut für Meereskunde, Hamburg, Germany  
 Peter Wiebe, Member, Woods Hole Oceanographic Inst., Mass., USA

### 4. **Scientific Area, Scientific Codes and percentage of discipline content** (See NATO classification of scientific subjects)

<b>Scientific Area*</b> (PST/LST/EST/SST)
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403	5 %	406	5 %	423	9 %
431	5 %	432	27 %	435	5 %
503	32 %	632	9 %	922	5 %

\* If using this form to report on a pre-1999 ARW, please enter the relevant Priority Area in box.

## 5. General Comments

The planning of the ARW started in 1999, resulting in an invitation from S. Skreslet to K. Birkenmajer to join the preparation of a NATO ARW application as a Partner-country Co-director. The planning was completed by submitting an application dated 26 March 2002, suggesting that the ARW should occur in Bodoe, north Norway, 12-16 November 2002. The NATO Advisory Panel did not approve but encouraged the applicants to submit a revised and updated application taking into account a more balanced country distribution, some experts added, a cheaper location and an expression of encouragement from the Norwegian Research Council. The Organising Committee agreed to change the location and time to Oslo 11-15 November 2003, in order to avoid domestic flight expenses in Norway. The new application was submitted 14 September 2002 but was again not approved by the Panel. However, the applicants were once more encouraged to submit an improved application, and were given most welcomed assistance by Dr Marek Lewandowski who was appointed by NATO SEA/EST to provide support. The third application that was submitted 15 October 2002 won the approval of the Panel, according to a letter of award dated 2 April 2003.

The application listed 27 invited scientists, out of who 21 were firm participants. Eventually, some of the participants could not come. S. Drobysheva died during complicated hospital surgery a few months before the ARW and J. Meincke informed that he could not leave his wife who suffered seriously degrading health during the last weeks prior to the ARW. P. Wiebe had to resign due to strong commitments related to a research vessel cruise that was unexpectedly rescheduled to the ARW time window. R.D. Dickson, G. Alekseev, and J. Madsen resigned because of overlapping commitments coming up. T. Vinje decided to resign because of his retirement from the Norwegian Polar Institute. A. Bukantis resigned and the Organising Committee agreed to appoint G. Stankunavicius from the same university. P.C. Reid was replaced by A. Walne representing the same institute. The final list of participants counted 22 scientists, all being specially invited key-note contributors. Dr Eric Mathey was assigned as secretary for the period of the ARW, assisting the Co-directors in practical matters.

The key-notes were presented as verbal contributions in plenary sessions. 18 extended abstracts were available as hand-outs before the meeting, and three were handed out at the beginning of the meeting. One session was devoted to information from Norwegian officials who are working with affairs related to Jan Mayen Island and the surrounding seas. The main sessions of the program were:

### 1<sup>st</sup> day Tuesday 11th

pm 0000-0200 Registration.  
 0200-0230 Welcoming address and practical information  
 0230-0540 Key-notes on geology and geophysics  
 0600-0700 Round-table discussion: Identification of new technologies and methods in geological and geophysical research in Polar regions

### 2<sup>nd</sup> day Wednesday 12th

am 0900-1140 Key-notes on marine ecology  
 1140-1200 Round-table discussion: Methodological challenges in Arctic marine ecology  
 pm 0200-0420 Key-notes on island ecology  
 0440-0530 Round-table discussion: Methods for research on anthropogenic stress in Arctic regions

### 3<sup>rd</sup> day Thursday 13th

am 0900-0940 Key notes on research logistics  
 0940-1040 Round-table discussion: Logistical options for research in the Jan Mayen Island region  
 1100-1120 Key-note on strategies for Arctic research  
 1120-1200 Round-table discussion: Identification of international research programs with relevance to Jan Mayen Island in the International Polar Year  
 pm 0200-0400 Information about Norwegian management of Jan Mayen Island and the Jan Mayen Fisheries Zone  
 0420-0600 Round-table discussion: Practical options for international scientific collaboration on Jan Mayen Island  
 0600-0700 Meeting between Organizing committee and Norwegian officials: Summing up of management options

### 4<sup>th</sup> day Friday 14th

am 0900-1200 Group work: Disciplinary science  
 pm 0200-0700 Group work: Interdisciplinary issues

### 5<sup>th</sup> day Saturday 15th

am 0900-1100 Round-table discussion: Scientific strategies and tactical means  
 1100-1200 Group work: Drafting of recommendations  
 pm 0100-0300 Group reports on recommendations  
 0300-0400 Round-table discussion: Conclusions  
 0400-0500 Summary.  
 0500 Formal closing of NATO ARW

The participants agreed that the conclusions from the NATO ARW should be made available to the Norwegian inter-ministerial group that is planning the use of infrastructure built on Jan Mayen Island for the purpose of Loran navigational systems. However, the formal connections will also include the Norwegian Ministry of Education and Science, the Norwegian Research Council, and different governmental institutions and non-governmental organizations in Europe and North America.

**6. National distribution of Lecturers (L) and ASI Students (S) - for Advanced Study Institute  
National distribution of Key speakers (K) and other Participants (P) - for Advanced Research Workshop**

	L/K	S/P		L/K	S/P		L/K	S/P
<b><i>NATO countries</i></b>			<b><i>Eligible Partner countries</i></b>			<b><i>Other Partner countries</i></b>		
Belgium	2		Albania	1		Austria		
Canada			Armenia			Finland		
Czech Rep.		Azerbaijan			Ireland			
Denmark		Belarus			Sweden			
France	1	Bulgaria			Switzerland			
Germany			Croatia					
Greece		Estonia			<b>Sub-Total</b>			
Hungary		Georgia						
Iceland		Kazakhstan						
Italy		Kyrgyz Rep.						
Luxembourg		Latvia						
Netherlands	1	Lithuania		1				
Norway	5	Moldova						
Portugal			Poland		4			
Spain		Romania						
Turkey		Russia		4				
UK	2	Slovak Rep.						
USA			Slovenia					
		Tajikistan						
		the former Yugoslav Rep. of Macedonia <sup>(1)</sup>						
		Turkmenistan		1				
		Ukraine						
		Uzbekistan						
<b>Sub-Total</b>	11		<b>Sub-Total</b>	11				
			<b><i>Med. Dialogue countries</i></b>					
			Algeria					
			Egypt					
			Israel					
			Jordan					
			Mauritania					
			Morocco					
			Tunisia					
			<b>Sub-Total</b>					
						<b>TOTALS</b>		
						<b>GRAND TOTAL</b>		

**7. Publication of results of the meeting**

Title of Book : Jan Mayen Island in Scientific Focus

Editor : (a) Stig Skreslet

Publisher : Kluwer Academic Publishers

Expected Date of Publication : 15 September 2004

Editor's Comments

Please ensure that signatures of the Co-Directors appear on page 1

Date

Attachments : Annex 1– List of Director(s), Lecturers/Key Speakers and ASI Students/Other Participants:  
Annex 2 - Scientific Abstract

**Annex 1**  
**GENERAL REPORT - ASI or ARW**  
**LIST OF DIRECTORS AND KEY SPEAKERS (for Advanced Research Workshop)**

NAME	FULL OFFICIAL ADDRESS (Institution, Street, Town, Country)
(a) Directors Birkenmajer, Krzysztof Skreslet, Stig	Inst. of Geological Sciences, Polish Academy of Sciences, Senacka 1, 31-002 Krakow, Poland. Faculty of Fisheries and Natural Sciences, Bodoe Regional University, Moerkvedbukta, N-8049 Bodoe, Norway.
(b) Lecturers or Key speakers	
<u>Canada</u> Hobson, Keith A. Rouvinen-Watt, Kirsti	Prairie and Northern Wildlife Research Centre, Canadian Wildlife Service, 115 Perimeter Road, Saskatoon, SK S7N 0X4, Canada. Department of Plant and Animal Sciences, Nova Scotia Canada, P.O. Box 550, Truro, Nova Scotia, B2N 5E3, Canada.
<u>Estonia</u> Vana, Marko	Institute of Environmental Physics, University of Tartu, Ülikooli Street 18, 50090 Tartu, Estonia.
<u>Germany</u> Hirche, Hans-Jürgen	Alfred-Wegener-Institut für Polar- und Meeresforschung, Colombustr., 27515 Bremerhaven, Germany.
<u>Lithuania</u> Stankunavicius, Gintautas	Department of Hydrology/Climatology, Vilnius University, Ciurlionio St. 21, Vilnius 2000, Lithuania.
<u>Netherlands</u> Hacquebord, Louwrens	Arctic Centre / Groningen Institute of Archaeology, University of Groningen, PO Box 716, 9700 AS Groningen, The Netherlands.
<u>Norway</u> Barr, Susan Gabrielsen, Geir W. Gulliksen, Bjørn Hagen, Jon O.M.	Norwegian directorate for cultural heritage, P.O. Box 8196 Dep, N-0034 Oslo, Norway. Norwegian Polar Research Institute, Polarmiljoesenteret, N-9296 Tromsø, Norway. Norwegian College of Fisheries, University of Tromsø, Breivika, N-9037 Tromsø, Norway. Institute of Geography, University of Oslo, P.O. Box 1042 Blindern, N-0316 Oslo, Norway.
<u>Poland</u> Glowacki, Piotr Piechura, Jan Weslawski, Jan. M.	Polar and Marine Research Department, Institute of Geophysics, Polish Academy of Sciences, ul. Ksiecia Janusza 64, 01-452 Warszawa, Poland. Institute of Oceanology, Polish Academy of Sciences, ul. Powstancow Warszawy 55, 81-712 Sopot, Poland. Institute of Oceanology, Polish Academy of Sciences, ul. Powstancow Warszawy 55, 81-712 Sopot, Poland.
<u>Russia</u> Byshev, Vladimir Klyashtorin, Leonid Melnikov Igor A. Romanov, Vladimir F.	P.P.Shirshov Institute of Oceanology, Russian Academy of Sciences, Nakhimovski pr. 36, Moscow 117851, Russia. Federal Institute of Fisheries and Oceanography (VNIRO), Russian Academy of Sciences, Krasnoselskaya, 17, Moscow 107140, Russia. P.P. Shirshov Institute of Oceanology, Russian Academy of Sciences, Nakhimovski st. 36, Moscow 127324, Russia. Arctic and Antarctic Research Institute, Russian State Science Center, Bering st.,38, 199397 St.Petersburg, Russia.
<u>Ukraine</u> Kyyak, Volodymyr G.	Institute of the Carpathians Ecology, National Academy of Sciences of Ukraine, Kozelnytska Street, 4, 79026 L'viv, Ukraine.
<u>United Kingdom</u> Walne, Anthony Shimmiel, Graham B.	Sir Alister Hardy Foundation for Ocean Science, 1 Walker Terrace, The Hoe, Plymouth, England PL1 3BN. Dunstaffnage Marine Research Laboratory, P.O. Box 3, Oban, Scotland PA3 4AD.

**Annex 1**  
**GENERAL REPORT - ASI or ARW**  
**LIST OF OTHER PARTICIPANTS (if Advanced Research Workshop)**

NAME	FULL OFFICIAL ADDRESS (Institution, Street, Town, Country)
<p>(c) 'Other Participants'  <u>NATO ARW Secretary</u>            Mathey, Eric  <u>Norwegian governmental officials</u>            Bjørge, Arne            Hubert-Hansen, Jan P.            Hov, Oeystein            Orheim, Olav            Skagestad, Odd G.            Tviberg, Leif K.</p>	<p>Faculty of Fisheries and Natural Sciences, Bodoe Regional University, Moerkvedbukta, N-8049 Bodoe, Norway.            Institute of Marine Research, P.O.Box 1870 Nordnes, N-5817 Bergen, Norway.            Norwegian Directorate for Management of Nature, Tungasletta 2, N-7005 Trondheim, Norway.            Norwegian Meteorological Institute, P.O.Box 43 Blindern, N-0313 Oslo, Norway.            Norwegian Polar Research Institute, P.O.Box 399, N-9001 Tromsøe, Norway.            Norwegian Ministry of Foreign Affairs, 8114 Dep, N-0032 Oslo.            Norwegian Ministry of Fisheries, P.O. Box 8118 Dep, N-0032 Oslo, Norway.</p>

**SCIENTIFIC ABSTRACT**

Advanced Research Workshop

Title of Meeting:

Joint International Scientific Observation Facility on Jan Mayen Island

Name and affiliation of Co-Directors:

i) Stig Skreslet, Bodoe Regional University, N-8049 Bodoe, Norway.

ii) Krzysztof Birkenmajer, Inst. of Geological Sciences, Polish Academy of Sciences, Senacka 1, 31-002 Krakow, Poland.

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**Scientific Content**

Jan Mayen Island is a very remote and isolated island in the Nordic Seas. It is located on the Mid-Atlantic Ridge and has an active volcano that has generated the local geological structures. Its geographical position gives it an important role as an observation site in the global network of meteorological stations. It is positioned close to the region where Greenland Sea Deep Water is formed and subsequently advected to the southern hemisphere, from where a surface flow returns water from the Pacific to the North Atlantic. This conveyor-belt system is brought into focus whenever variations in the global climate are discussed. At Jan Mayen Island the warm and saline Atlantic water meets cold and fresher Polar water, and generates conditions that influence the biological productivity which supports unique bio-geographical features. These conditions are important not only to the marine ecology and the fisheries resources of the region, but also in relation to the trophic flow of energy to terrestrial and freshwater systems on the island itself. Thus, there are several considerations that warrant research efforts to be made in Jan Mayen Island waters and on the island itself.

Each year, several institutions and individual scientists apply to Norwegian authorities for logistical support to go there, but with negative results. The area is rather inaccessible to research vessels in winter, due to the formation and drift of sea-ice. The large distance from European harbours also makes research efforts in summer rare and brief. Both marine research and terrestrial operations require high-tech logistics for field operations, supply systems and support from a home-base in Norway. There is an air-field on the island, and most of the transport of personnel and cargo by plane and ships occur from Bodoe, a coastal town in northern Norway. However, foul weather and low visibility due to fog are frequent obstacles that make transportation and landings risky and random.

Besides reporting meteorological data from the island, the crew also comprises personnel that serves a Loran navigation unit. However, satellite navigation has now become more efficient and makes the Loran system less important. Accordingly, Norwegian authorities have considered to terminate the Jan Mayen Island Loran station, and now assess whether the established infrastructure should be dismantled or serve new purposes.

The intention behind the present NATO ARW was to perform a feasibility study on whether existing infrastructure on Jan Mayen Island may be taken into use as an international research station for multidisciplinary purposes. To identify scientific problems that could be addressed by research activities on Jan Mayen Island and in the oceanic region around the island, the participants were carefully selected according to their scientific training and experience. Some were highly experienced from previous fieldwork in polar regions and able to address particular arctic problems that could be solved by adding observations from the Jan Mayen area, or that were unique in an arctic context. Others were selected from their particular expertise, and were asked to identify more universal scientific problems that could improve the understanding within their scientific field by making observation on or at the island.

In their talks the invited specialists identified problems and observation methods that were potentially applicable to Jan Mayen Island research. All contributors identified features or scientific problems that were either unique to Jan Mayen Island or they referred to its isolated position as an asset in large-scale regional or hemispheric research. For instance is the island geographically positioned in an area of complicated air-sea interaction that may provide data of great value for the validation of numerical models that simulate atmospheric processes. Also, the presence of scientific staff and/or equipment on the island may provide easy and frequent access to features that are part of larger-scale processes, not least the volcanology of the mid-Atlantic Ridge and the meso-scale features that are involved in the formation of Greenland Deep Sea Water.

Despite its isolation, the island may serve as a stepping-stone for dispersal of terrestrial plants and sub-littoral benthos across the Nordic Seas. Its large distance from industrial land and off-shore activities makes its biological communities interesting targets for the study of assimilation of non-degradable toxic substances from oceanic food-webs. Its highly productive waters also support large populations of marine invertebrates, fish and mammals that are vulnerable to exploitation. The composition of its present fauna may have resulted from anthropogenic influence and may change again in accordance with preservation and restoration measures. Reintroduction of the supposedly extinct Arctic fox may for instance erase newly established terrestrial elements of the avifauna.

Jan Mayen Island has a cultural landscape that is only weakly influenced by previous anthropogenic activities. However, what is there, are subjects for documentation of a cultural heritage related to European whaling, Norwegian fox trapping, scientific

expeditions, meteorology, and military activities during World War II and the Cold War. Studies of these activities may provide important information to the planning of future scientific activities that seek to avoid similar traces.

The specific information provided by each participant provided information for the group and plenary discussions. Three disciplinary groups in the fields of 1) Geology, geophysics and geochemistry, 2) Island ecology, and 3) Pelagic organismic systems, were given five specified tasks:

- Identify characteristic features, scientific objectives and methods related to a base-line census of Jan Mayen Island in 2005 and/or 2006.
- Identify unique Jan Mayen Island features of importance to the understanding of larger-scale processes in a global, hemispherical and/or basin-scale context.
- Outline incentives for linking Jan Mayen observations to large international programs in the forthcoming International Polar Year (IPY 2007-08).
- List appropriate Jan Mayen region time series that should be established in relation to research and monitoring of climate change and variability.
- Suggest methods for preservation or control of objects in relation to environmental protection and management.

Next, the participants formed small, interdisciplinary groups that were to discuss four themes related to research logistics aimed at scientific operations on Jan Mayen Island:

- What kind of scientific instruments would be required in Jan Mayen operations to support your own science?
- What kind of observations from other fields of science may support your field of science?
- What kind of observations require presence of:
  - Qualified scientists?
  - Trained technical staff?
- How can parts of your science be supported by satellites, fixed automated stations or remotely controlled vehicles?

Following the group reports given in plenary sessions, the participants came up with some recommendations for the nearest few years ahead:

- After the termination of the Loran navigational system in 2005, the infrastructure should be maintained for some years to allow for:
  - Historical documentation of the facilities.
  - Use of buildings for scientific purposes, allowing for minor modifications.
- In the summers of 2005/2006, use the existing infrastructure to perform a broad census of the natural and anthropogenic features on the island and in its sub-littoral zone.
- In the IPY 2007-08, take buildings and other infrastructure into year-round use for international cooperative science.

In a longer perspective, the participants suggested some considerations:

- Assess the need for modernization or reconstruction of facilities.
- Upgrade the airfield and its instrumentation for more regular exchange of personnel and transportation of supplies.
- Consider the use of unconventional aviation technology for transportation and observations, like air ships, air planes for vertical or short take-off and landing, and parachuting. Helicopters, hoover-crafts and snow-mobiles have already proved their worth under Arctic conditions.
- Conservancy of the nature on Jan Mayen Island require logistics that remove refuse from scientific activities. Devices for compression, packing and safe transportation to the Norwegian mainland, will be needed.
- In Bodo, Norway, warehouse logistics will be needed for storing of supplies and gear for research groups making periodic visits to Jan Mayen Island, before the transportation by air planes or ships.
- To reduce unnecessary and frequent transportation of scientific gear to and from Jan Mayen, some basic instruments should be permanently based and serviced on the island.
- To maintain research station facilities, and automated or remotely operated instruments and robots, a permanent staff of about five research technicians should be established. Two teams should rotate on half-year terms. Considering five-year contracts to build up qualifications to a sufficient level, the turnover exchange would be one technician every year.
- Considerable efforts should be put into safety precautions, taking into consideration the volcanic activity and especially, the strong winds and the low visibility due to fog and drifting snow and sand.
- During summer, there will be a need for a medium-sized ship for research observations at sea, transportation of land parties, and as a security precaution for the stationed personnel. It may also serve local coast guard functions related to nature protection and unauthorized landings on the island. The ship should be able to operate oceanographic instruments and samplers, and perform fishing, maintenance of drifters and moored installations. It should have sufficient fuel capacity to operate for 2-3 months and have considerable capacity for carrying cargo to and from the island.

The group of scientists who took part in the NATO ARW unanimously expressed their interest in the possibility of doing research at a Norwegian station that could serve international science programs. It would especially allow the small nations to take part in Arctic research at a location of great importance to North Atlantic resource management and global climate change.

## **Main lectures/papers given**

(Chronological and thematic order)

### General ecology

Stig Skreslet. Jan Mayen Island ecology in relation to the Arctic Mediterranean Ecosystem.

### Geology and geophysics

Krzysztof Birkenmajer. Outline of geology of Jan Mayen Island and surroundings.

Jon Ove Hagen. The potential of the Beerenberg glaciers for studies of global climate.

Gintautas Stankunavicius. Meteorological observations from Jan Mayen Island in forecasting of Baltic weather.

Vladimir Byshev. Air-Sea Interactions in the Nordic Seas.

Jan Piechura. The circulation of the Nordic Seas.

Vladimir F. Romanov. Northern hemispheric air transportation.

### Marine ecology

Hans-Jürgen Hirche. Zooplankton dynamics in the Greenland Sea from front to front, and from the surface to the bottom.

Anthony Walne. Extension of the SAHFOS observational system into the Nordic Seas.

Igor A. Melnikov. Sea ice biological signal of global changes in the Arctic Ocean.

Leonid Klyashtorin. Effects of climatic variability on fisheries resources in the Nordic Seas.

Jan M. Weslawski. Littoral ecology of Arctic Islands as a tool for climate change research.

Bjoern Gulliksen. The marine sublittoral fauna of Jan Mayen Island.

Geir Wing Gabrielsen. The birds of Jan Mayen Island and the surrounding seas.

### Island ecology

Keith A. Hobson. Challenges in studies of polar marine and freshwater foodwebs.

Volodymyr G. Kyyak. Modes and time-scales for colonisation and dispersal of plants in remote arctic and alpine habitats.

Marko Vana. Monitoring of anthropogenic aerosols in remote Arctic areas.

Kirsti Rouvinen-Watt. Biological premises for management of the Arctic fox (*Alopex lagopus*) populations.

Louwrens Hacquebord. The Jan Mayen whaling industry, its exploitation of Greenland whales and use of local options.

Susan Barr. Past and present infrastructure of Jan Mayen as historical documents.

### Research logistics

Susan Barr. The logistics of past scientific research on Jan Mayen Island.

Piotr Glowacki. Challenges and solutions for scientific operations in remote Arctic islands.

### Strategies for Arctic research

Graham B. Shimmield. Jan Mayen Island and its waters as a potential scientific target for European Arctic research.

### Norwegian management of Jan Mayen Island and the Jan Mayen Fisheries Zone

Jan Petter Huberth Hansen. Norwegian responsibilities in relation to Jan Mayen Island research.

Olav Orheim. The involvement of the Norwegian Polar Research Institute in current and future research in the Jan Mayen Island area.

Oeystein Hov. The meteorological observation facilities of Jan Mayen Island.

Arne Bjørge. Governmental investigations on applied fisheries ecology and resource assessment in the Nordic Seas.

Leif K. Tviberg. Infrastructure on Jan Mayen island - status and plans for the future.

Odd G. Skagestad. The scope for Norwegian commitments related to international research operations on Jan Mayen Island.