

## Summary and recommendations from the:

<b>Joint Workshop on Polar Research</b> <b>MINISTRY OF EARTH SCIENCES</b> <b>NATIONAL CENTRE FOR ANTARCTIC AND OCEAN RESEARCH</b> <b>&amp;</b> <b>THE NORWEGIAN RESEARCH COUNCIL</b>	
<b>Dates 13<sup>th</sup> and 14<sup>th</sup> November 2013.</b>	<b>Venue: MoES, New Delhi</b>

Summary written by: Dr. Kim Holmén, Norwegian Polar Institute

The workshop was held at the Ministry of Earth Sciences (in the Avani Hall, Prithvi Bhawan, Lodi Road, New Delhi) from 2pm on November 13 until lunch on November 14. The workshop program as executed is attached as **appendix 1** and the attendee list is found in **appendix 2**.

The entire meeting was colored by a warm and friendly creativity with eager searching for research opportunities with mutual interest.

All presented subjects at the meeting have potential for future collaborative projects. It was, nevertheless, apparent that some areas are ripe for immediate commencement whereas others will require further development in order to bear fruit. With respect to the latter, the Research Council of Norway pointed out that there are funds available for procurement through the Svalbard Science Forum which could be relevant for such project development.

The educational program of UNIS was also presented at the workshop. Although not affiliated with a specific research topic it was widely acknowledged that student exchange programs will generally stimulate the establishment of future cooperative research activities.

The subjects<sup>1</sup> that were presented and discussed at the workshop are listed below. The list reflects what the workshop managed to cover within its constraints and should be viewed as a starting point for forthcoming endeavors. The list is organized in the following manner:

- marks general subject areas identified
- ▶ marks specific scientific topics
- ☺ lists institutions that are potential contributors to these topics

### List of subject areas identified by the workshop as valuable research directions

- Role of Antarctic Shelf Ice in the climate system
  - ▶ Ice Rises and their influence on calving processes
    - ☺ NPI, NCAOR
  - ▶ Ice Shelf - ocean interactions and climate change
    - ☺ UiB, Akvaplan-NIVA, INCOIS, NPI
- Fjord oceanography with special emphasis on the Kongsfjorden system
  - ▶ interaction with glaciers
    - ☺ NPI, NCAOR, NIOT
  - ▶ freshwater fluxes and climate change
    - ☺ NPI, NCAOR, NIOT
  - ▶ Marine biology and climate change
    - ☺ NPI, UNIS, NCAOR, NIOT, INCOIS
  - ▶ fjord circulation (measurements and modeling)
    - ☺ NPI, UNIS, NCAOR, NIOT, INCOIS
- Arctic ocean – Asian monsoon interconnections
  - ▶ Influence of snow and ice distribution on atmospheric general circulation
    - ☺ NCAOR, UiO, NILU, NPI
  - ▶ Paleoclimate studies to elucidate Arctic – India climate teleconnections
    - ☺ NCAOR, NPI, UNIS
- Glaciology
  - ▶ Mass balance studies in Svalbard
    - ☺ UiO, NPI, NCAOR
  - ▶ Remote sensing and digital elevation models
    - ☺ UiO, NPI, NCAOR
- Atmospheric aerosols
  - ▶ Characterization of aerosols in the Arctic
    - ☺ SPL, NCAOR, NPI, NILU
  - ▶ Black carbon and snow interactions (comparative studies between Svalbard and The Himalayas)
    - ☺ SPL, NCAOR, NPI, NILU

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<sup>1</sup> Geo-hazards and in particular snow and rock avalanches in frozen and mountainous terrain was suggested by UNIS to be a subject of common interest. This subject is of paramount importance and should be part of a future Norway-India cooperative research portfolio. Geo-hazards is already a prioritized subject by the Joint Working Group Science & Technology and should be included in a overarching MoU.

## Appendix 1: The agenda for the joint workshop

<b>Joint Workshop on Polar Research</b> <b>MINISTRY OF EARTH SCIENCES</b> <b>NATIONAL CENTRE FOR ANTARCTIC AND OCEAN RESEARCH</b> <b>&amp;</b> <b>THE NORWEGIAN RESEARCH COUNCIL</b>		
<b>Dates 13<sup>th</sup> and 14<sup>th</sup> November 2013.</b>		<b>Venue: MoES<sup>2</sup>, New Delhi</b>
<b>Date: 13.11.2013</b>		
Time		Speaker
	<b>WELCOME</b>	<b>Moderator: Dr. Kim Holmén</b>
14:00 to 14:20	Welcome Address	Dr. Shailesh Nayak, Secretary, MoES
14:20 to 14:30	Welcome Address	H.E. Eivind S. Homme, Ambassador, Norway
14:30 to 14:55	Norwegian Research Strategies and Indo-Norwegian Research Cooperation Opportunities	Ms. Nina Therese Maubach Mr. Jon Heikki Aas
14:55 to 15:25	Coffee Break	
	<b>Glaciers and Ice</b>	<b>Moderator: Dr. S. Rajan</b>
15:25 to 15:55	Ice Rises: emerging research frontier in Antarctica	Dr. Kenichi Matsuoka, Research Scientist, NPI
15:55 to 16:25	Regional climate reconstruction using ice cores from coastal Antarctica: retrospective and prospects	Dr. Thamban Meloth, Scientist, NCAOR
16:25 to 16:55	Glacier freshwater contributions to Kongsfjord	Dr. Jack Kohler, Senior Research Scientist, NPI
16:55 to 17:25	Glaciological studies by India in the Arctic	Dr. Paramanad Sharma, Scientist, NCAOR
17:25 to 17:55	Natural Hazards prevention in a changing climate	Dr. Jan Otto Larsen, Associate Professor, UNIS
17:55 to 18:25	Remote sensing for remote places: Observing glacier processes and changes	Dr. Christopher Nuth, Researcher, University of Oslo
19:25 to 21:55	Dinner hosted by Secretary, MoES and Chairman-ESSO	
<b>Date: 14.11.2013</b>		
	<b>Infrastructure and Education</b>	<b>Moderator: Dr. S. Rajan</b>
09:00 to 09:30	SIOS- an international infrastructure development	Dr. Kim Holmén, International Director, NPI

<sup>2</sup> Acronyms used in Appendix 1 are clarified in Appendix 2

	program in Svalbard	
09:30 to 09:45	UNIS: education opportunities in Svalbard	Dr.Jan Otto Larsen, Associate Professor, UNIS
09:45 to 10:10	Long term monitoring of Kongsfjorden	Dr.K.P.Krishnan, Scientist, NCAOR
10:10 to 10:35		Dr.S.S.C.Shenoi, Director, INCOIS
10:35 to 11:00	Coffee Break	
	<b>Climate</b>	<b>Moderator: Ms. Nina Therese Maubach</b>
11:00 to 11:25	Slope processes around Antarctica	Dr. Svein Østerhus <sup>3</sup> , University of Bergen
11:25 to 11:50	Connecting glacier fronts, fjords and the open ocean using numerical circulation models and field data	Dr.Arild Sundfjord, Research Scientist, NPI
11:50 to 12 15	The influence of Arctic snow on monsoons & atmospheric studies	Dr.Kim Holmén and co-authors <sup>4</sup> , International Director, NPI
12:15 to 12:40	Talk on atmospheric aerosols and their characterization over the Arctic	Dr.S.Suresh Babu, SPL
12:40 to 13:00	Summary of the deliberations at the workshop	Dr.Kim Holmén, NPI and Dr.S.Rajan, Director, NCAOR
13:00 to 14:00	Lunch hosted by H. E. Ambassador of Norway to India	

<sup>3</sup> Presented by Dr. Kim Holmén on behalf of Dr. Svein Østerhus and colleagues

<sup>4</sup> Dr. Frode Stordal (University of Oslo) and Dr. Yvan Orsolini (Norwegian Institute of Air Research)

## Appendix 2, Participants at the workshop

### From Ministry of Earth Sciences (MoES)

1. Dr. Shailesh Nayak, Secretary, MoES
2. Mr. Anand S. Khati, Joint Secretary, MoES
3. Dr. S.K. Das, Scientist G, MoES
4. Dr. (Mrs) Swati Basu, Scientist G, MoES
5. Shri. R.K. Sharma, Scientist G, MoES
6. Dr. (Mrs) Parvinder Maini, Scientist F, MoES
7. Shri. Rasik Ravindra, Panikkar Professor, MoES

### From National Centre for Antarctic and Ocean Research (NCAOR)

1. Dr. S. Rajan, Director, NCAOR
2. Dr. C.T. Achuthankutty, Visiting Scientist, NCAOR
3. Dr. Thamban Meloth, Scientist E, NCAOR
4. Dr. Paramanand Sharma, Scientist D, NCAOR
5. Dr. K.P. Krishnan, Scientist D, NCAOR
6. Ms. Divya David, Scientist B, NCAOR
7. Mr. Swatantar Kumar, Research Scientist B, NCAOR
8. Mr. Rupesh Kumar Sinha, Senior Research Fellow, NCAOR
9. Ms. Neelu Singh, Senior Research Fellow,

### From Indian National Centre for Ocean Information Services (INCOIS)

1. Dr. S.S.C. Shenoi, Director, INCOIS

### From National Institute of Ocean Technology (NIOT)

1. Dr. M.A. Atmanand, Director, NIOT
2. Mr. Arul Muthiah, Scientist D, NIOT

### From Space Physics Laboratory, Vikram Sarabhai Space Centre (SPL-VSSC)

1. Dr. S. Suresh Babu, Scientist, SPL-VSSC

### From The Norwegian Polar Institute (NPI)

1. Dr. Kim Holmén
2. Dr. Arild Sundfjord
3. Dr. Kenichi Matsuoka
4. Dr. Jack Kohler

### From The University Centre in Svalbard (UNIS)

1. Dr. Jan Otto Larsen

### From The University of Oslo (UiO)

1. Dr. Christopher Nuth

From The Research Council of Norway (RCN)

1. Mr. Jon Heikki Aas
2. Ms. Nina Therese Maubach

From The Royal Norwegian Embassy in New Delhi

1. H.E. Ambassador Eivind Homme
2. Ms. Signe Gilen
3. Mr. Håvard Hugaas
4. Mr. Petter Tollefsen
5. Ms. Marianne Jensen (RCN)