



SaGHAA 5

The 5th Conference on
SCIENCE & GEOPOLITICS OF
**Himalaya
Arctic
Antarctic**

FEBRUARY 26-27, 2019
INDIA INTERNATIONAL CENTRE
NEW DELHI



PROGRAMME SCHEDULE

SaGHAA 5

**Technological Innovations
and Research Expeditions**

Organised by



5th Conference on
Science & Geopolitics of
HIMALAYA-ARCTIC-ANTARCTIC
FOCUS: TECHNOLOGICAL INNOVATIONS AND
RESEARCH EXPEDITIONS

PROGRAMME SCHEDULE
February 26-27, 2019

| 1000-1030 | INAUGURAL SESSION |
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| | Welcome Address by Dr Rasik Ravindra , <i>Chairman, Organising Committee, SaGHAA 5</i> |
| | Address by Dr B Meenakumari , Former Chairperson, National Biodiversity Authority <i>Special Guest</i> |

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| | Address by Dr P S Goel Raja Ramanna Professor, NIAS, ISRO <i>Chief Patron, SaGHAA 5</i> |
| | Address by Mr Helge Tryti , Commercial Counsellor, Royal Norwegian Embassy, & Director of Innovation Norway India <i>Guest of Honour</i> |
| | Address by Dr M N Rajeevan Secretary, Ministry of Earth Sciences <i>Chief Guest</i> |
| | Vote of Thanks by Ms S Chattopadhyay , <i>Convenor, SaGHAA 5, 2019</i> |
| 1030-1045 | Interaction and Tea Break |
| 1045-1245 | Session 1: Current Trends in Polar Sciences |
| Chairs | Dr P S Goel , Raja Ramanna Professor, NIAS, ISRO Dr Nalan Koc , Director, Norwegian Polar Institute, Tromsø |
| | Rapporteur Lavkush K Patel and Ms Namrata Barooa |

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| Keynote Speaker 1045-1100 | Dr R Krishnan <i>Senior Scientist & Executive Director,</i> Centre for Climate Change Research, Indian Institute of Tropical Meteorology, Pune Title: <i>Possible role of Arctic amplification on weather extremes in the Himalayan region</i> |
| 1100-1115 | Dr Vijay Kumar Soni <i>Senior Scientist,</i> Indian Meteorological Department, New Delhi Title: <i>Perspectives of Polar Weather Monitoring and Research Efforts of India Meteorological Department</i> |
| 1115-1125 | Dr. Manish Tiwari <i>Senior Scientist & Incharge,</i> (Paleoceanography) National Centre for Polar & Ocean Research, Goa Title: <i>Pliocene Arctic Climate Teleconnection (PACT) – A Joint Indo-Norwegian Endeavour</i> |
| 1125-1135 | Dr. Ashit Kumar Swain <i>Superintending Geologist</i> Geological Survey of India, SU, Sikkim Title: <i>Need to worry about Polar Lakes</i> |
| 1135-1145 | Dr S K Roy, <i>Geological Survey of India, Nagpur</i> Title: <i>Geology of Schirmacher Oasis, cDML in light of the Passage of East African Orogeny through Antarctica - A review</i> |

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| 1145-1155 | <p>Dr Rahul Mohan, <i>Group Director</i> ESSO-National Centre for Polar & Ocean Research <i>Title: Southern Ocean Paleoceanography Using Diatoms</i></p> |
| 1155-1205 | <p>Dr Avinash Kumar, <i>Scientist,</i> ESSO-National Centre for Antarctic & Ocean Research, Ministry of Earth Sciences, Government of India <i>Title: An Accelerated decline in the Arctic sea ice cover: A record minimum in Summer 2018</i></p> |
| 1205-1215 | <p>Dr Lalu Raj, <i>Senior Scientist,</i> NCPOR <i>Title: Antarctic 'Ice Dust' reveals Climate Change Secrets</i></p> |
| 1215-1225 | <p>Dr Vimlesh Pant, Associate Professor, CAS, IIT Delhi <i>Title: Impact of Arctic sea-ice changes on oceanic physical-biological characteristics in the Arctic Ocean</i></p> |
| 1225-1235 | <p>Dr Sanjay Chaturvedi <i>Professor and Dean,</i> South Asian University(SAU) <i>Title: Re-visiting Antarctic Geopolitics: Continuity and Change</i></p> |
| 1235-1245 | <p><i>Discussion</i></p> |

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| 1245-1515 | Session 2: Ocean Exploration | |
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| Chairs | <p>Dr M A Atmanand, <i>Director, National Institute of Ocean Technology</i></p> <p>Dr Inger Midtkandal <i>Science and Technology Counsellor, Royal Norwegian Embassy in New Delhi, India</i></p> <p>Commercial Section, Innovation Norway</p> | <p>Rapporteur Dr Parmanand Sharma and Dr Mahesh Badanal</p> |
| Keynote Speaker 1245-1300 | <p>Dr. Nalan Koc, <i>Director, Norwegian Polar Institute, Tromso</i></p> <p>Title: <i>Planning for multi-disciplinary observations</i></p> | |
| 1300-1310 | <p>Dr. David Agnew <i>Executive Secretary,</i> Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR)</p> <p>Title: <i>CCAMLR: Meeting new challenges in the management of Antarctic Marine Living Resources</i></p> | |

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| 1310-1320 | Dr. N Saravanane <i>Scientist</i> , Centre for Marine Living Resources and Ecology Title: <i>Recent Trends and Renewed Interests in Establishing MPA in Southern Ocean-Indian Perspective</i> |
| 1320-1330 | Capt. J S Gill <i>FCMM, F.R.Met/S, FCILT, M.I.Mar. Tech</i> Title: <i>Marine Scientific Research Vs UNCLOS 82</i> |
| 1330-1420 | LUNCH |
| 1420-1430 | Dr Sarat Chandra Tripathy <i>Senior Scientist, Group Director I/C (Ocean Sciences)</i> ESSO-National Centre for Polar and Ocean Research, Ministry of Earth Sciences Title: <i>Salient findings from the Indian Southern Ocean Expeditions</i> |
| 1430-1440 | Dr. Shridhar Jawak, <i>Remote Sensing Officer (Sr. Adviser),</i> Svalbard Integrated Arctic Earth Observing System (SIOS), Longyearbyen, Norway Title: <i>Technological innovations in Earth observation and remote sensing to provide geo-information in Svalbard</i> |

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| 1440-1450 | Dr Anand Jain, <i>Project Scientist</i> Arctic expedition and logistics division National Centre for Polar and Ocean Research, Goa Title: <i>Bacterial communities involved in complex organic carbon cycling in a high Arctic fjord: A small beginning towards a larger goal</i> |
| 1450-1500 | Dr Asha Devi <i>Scientist-D,</i> Centre for Marine Living Resources and Ecology Title: <i>Ecology of microzooplankton in the Arctic Fjord Kongsfjorden and comparison with major ecosystems</i> |
| 1500-1510 | Dr Rajeev Saraswat <i>Senior Scientist,</i> National Institute of Oceanography Title: <i>Did polar regions modulate glacial- interglacial transitions in the northern Indian Ocean?</i> |
| 1510-1520 | DISCUSSION |
| 1520-1625 | Session 3: Ice Class |
| Chair | Mr Roar Marthiniussen Subsea Division at Kongsberg Maritime, Norway |
| | Rapporteur Dr Anand Jain and Mr Prakash Pandit |

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| Key Note Speaker 1520-1535 | Dr M A Atmanand, <i>Director,</i> National Institute of Ocean Technology <i>Title: Emerging Trends in Designing a Polar Research Vessel for Indian Polar Research Programme & its Cost-Benefit Analysis</i> |
| 1535-1545 | Dr Ekaterina Kim Norwegian University of Science and Technology <i>Title: Automated Vehicles in Arctic Marine Research and More</i> |
| 1545-1555 | Dr D. Rajasekhar <i>Senior Scientist, Project Director,</i> Vessel Management Cell, National Institute of Ocean Technology, Chennai <i>Title: Research Ship Management Strategy and Innovative Engineering Solutions</i> |
| 1555-1605 | Mr. Kari Laukia <i>Director, Head of Ship Design & Engineering</i> of Aker Arctic Technologies Inc. Finland <i>Title: Challenges in Designing PRVs.</i> |

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| 1605-1615 | Mr. Niklas Hallgren, <i>Chief Executive Officer,</i> Light Structures <i>Title: Monitoring the effects of ice forces with the Ice Class Research Vessel for Polar Code</i> | |
| 1615-1625 | DISCUSSION | |
| 1625-1640 | TEA | |
| 1640-1840 | Session 4: Himalaya-Climate Change | |
| Chairs | Dr Ajit Tyagi, <i>Former DGM,</i> Indian Meteorology Department Dr Gopal Iyengar, Advisor Ministry of Earth Science (MoES) | Rapporteur Dr Abul Amir Khan and Ms Namrata Barooa |
| Keynote Speaker 1640-1655 | Dr M Ravichandran, <i>Director,</i> National Centre for Polar & Ocean Research (NCPOR) <i>Title: Himalayan Cryosphere in a Changing Climate</i> | |
| Keynote Speaker 1655-1710 | Dr Gufran Beig <i>Senior Scientist,</i> Indian Institute of Tropical Meteorology <i>Title: Extreme Pollution Event and Stubble Burning Impacts</i> | |

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| 1710-1720 | <p>Prof. Milap C Sharma, <i>Professor</i> Centre for the Study of Regional Development, School of Social Sciences, Jawaharlal Nehru University, New Delhi Title: <i>Understanding Cryosphere-Climate Interaction and Societal Response in the NW Himalaya, India</i></p> |
| 1720-1730 | <p>Dr Ashwagosha Ganju <i>Former Director</i> Snow and Avalanche Study Establishment Defence Research & Development Organization Title: <i>Inner Himalaya: An Opportunity to turn Terrain to Economic Fortune</i></p> |
| 1730-1740 | <p>Dr A L Ramanathan <i>Professor,</i> School of Environmental Sciences, Jawaharlal Nehru University, New Delhi Title: <i>Monitoring of the Himalayan and Arctic Cryosphere: a multidisciplinary approach through in-situ observations</i></p> |
| 1740-1750 | <p>Dr. Sabin TP <i>Scientist D,</i> Centre for Climate Change Research Indian Institute of Tropical Meteorology Pune Title: <i>High-resolution global climate modeling for the Himalayan region</i></p> |

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| 1750-1800 | Dr A K Singh <i>Former Director,</i> ICAR-Directorate of Coldwater Fisheries Research (DCFR) Title: <i>Strategic Approaches to Promote Rainbow Trout Farming in India</i> |
| 1800-1810 | Dr S K Nandi <i>Senior Scientist & Former Group Head- EA&CC</i> G.B. Pant National Institute of Himalayan Environment & Sustainable Development, Uttarakhand Title: <i>Forest ecosystems and plant biodiversity: Climate change and implications in the Indian Himalaya region</i> |
| 1810-1820 | Dr Manish Pandey <i>Assistant Professor</i> in Centre for Research & Development, Chandigarh University Title: <i>Surface facies analysis vis-à-vis melting of a Western Himalaya Glacier</i> |
| 1820-1830 | Dr Lavkush Kumar Patel <i>Project Scientist,</i> National Centre for Polar and Ocean Research Title: <i>Thermal behaviour of debris covered glaciers, Western Himalaya</i> |
| 1830-1840 | DISCUSSION |
| 1900 | DINNER |

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| 0930-1100 | | Session 5: Geopolitics |
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| Chair | Dr P S Goel, <i>Raja Ramanna Professor,</i> NIAS, Indian Space Research Organisation | Rapporteur Dr Shridhar Jawak, and Dr Sweta Bhusan |
| Keynote Speaker 0930-0945 | HE Nils Kamsvag, <i>Ambassador of Norway to India,</i> The Royal Norwegian Embassy in New Delhi Title: <i>The Arctic Strategy of Norway</i> | |
| 0945-1000 | Prof Uttam K Sinha <i>Research Fellow,</i> Institute for Defence Studies and Analyse Title: <i>India and Arctic: Building an Arctic Culture</i> | |
| 1000-1015 | Mr. Stephan Lanzinger, <i>Head of Science Section,</i> German Embassy, New Delhi Title: <i>German Polar Research</i> | |
| 1015-1030 | Sulagna Chattopadhyay <i>President, LIGHTS,</i> <i>Editor, geographyandyou.com</i> Title: <i>Regional Cooperation in The Himalaya-Learning from The Arctic Council</i> | |

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| Panel Discussion 1030-1100 | Discussants Dr P S Goel, <i>Raja Ramanna Professor</i> , IAS, Indian Space Research Organisation Nils Kamsvag, <i>Ambassador of Norway to India,</i> The Royal Norwegian Embassy in New Delhi Mr Xue Qinzha, <i>First Secretary,</i> Sci-Tech Affairs, Chinese Embassy in India Mr. Stephan Lanzinger, <i>Head of Science Section,</i> German Embassy, New Delhi Ms Nelli Mikkola, <i>Second Secretary,</i> Embassy of Finland Ms Shivani Sharma, <i>Senior Advisor,</i> UK Science and Innovation Network, British High Commission | |
| 1130-1310 | TEA | |
| 1130-1300 | Session 6: Himalayan Glaciers | |
| Chairs | Dr M Ravichandran, <i>Director,</i> National Centre for Polar & Ocean Research Dr Rajesh Asthana, <i>Deputy Director General,</i> Geological Survey of India, Lucknow | Rapporteur Dr Cheryl and Dr Neelu Singh |

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| Keynote Speaker 1130-1145 | Prof. A. P. Dimri <i>Professor,</i> Jawaharlal Nehru University Title: <i>Himalayan Climate: Past and Future</i> |
| 1145-1155 | Dr M R Bhutiyani <i>Visiting Professor,</i> Department of Geology, Fergusson College, Pune Ex-Director, Defence Terrain Research Laboratory, Delhi Title: <i>Karakorum Anomaly - A myth or Reality</i> |
| 1155-1205 | Dr. Dhruv Sen Singh <i>Professor in Geology,</i> Centre of Advanced Study in Geology, University of Lucknow Title: <i>Geomorphology, Sedimentology and its implication for Climate change, Gangotri Glacier, Garhwal Himalaya</i> |
| 1205-1215 | Dr Parmanand Sharma <i>Scientist E & Scientist In-Charge</i> National Centre for Antarctic and Ocean Research, Goa Title: <i>Glacier Mass and climate change in the Himalaya and their effects on the humans and the Environments</i> |

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| 1215-1225 | Prof. B W Pandey Department of Geography, Delhi School of Economics, University of Delhi <i>Title: Himalayan Geosystem: Features, Challenges and Initiatives an Overview</i> |
| 1225-1235 | Dr Ashis K. Mitra ESSO-NCMRWF, MoES <i>Title: Real-Time Polar Sea-Ice Prediction with NCMRWF Coupled Model</i> |
| 1235-1245 | Mr. Antti Hyvärinen, <i>Scientist,</i> Head of Group: Atmospheric Aerosols Finnish Meteorological Institute <i>Title: Role of light absorbing impurities on the Arctic and Himalayan cryosphere</i> |
| 1245-1255 | Dr Pankaj Kumar <i>Assistant Professor,</i> Department of Geography, Delhi School of Economics, University of Delhi. <i>Title: Glacial Lake Outburst Flood in Lahaul and Spiti district, Himachal Himalaya, India</i> |
| 1255-1310 | DISCUSSION |
| 1310-1350 | Rapid Shot Session |
| Chairs | Dr Rahul Mohan, <i>Group Director</i> ESSO-National Centre for Polar & Ocean Research |

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| 1310-1320 | <p>Dr Mahesh Badanal <i>Scientist Antarctic Science Division</i> National Center for Polar and Ocean Research Title: <i>Paleolimnological records from the ice-free regions of Schirmacher Oasis and Larsemann Hills, East Antarctica</i></p> |
| 1320-1325 | <p>Dr Cheryl A Noronha-DMello <i>Project Scientist B,</i> National Center for Polar and Ocean Research Title: <i>Subglacial lakes: Scope for Indian Exploration in Antarctica</i></p> |
| 1325-1330 | <p>Dr Abul Amir Khan Department of Geology, University of Delhi Title: <i>Late Quaternary glacial stratigraphy of upper Indus valley, Ladakh in comparison with global climate record</i></p> |
| 1330-1335 | <p>Shri Udhayaraj A D Wildlife Institute of India (WII) Title: <i>Mapping vegetation extent in the Antarctic oasis using Multispectral Remote Sensing data</i></p> |
| 1335-1340 | <p>Mr Shubhang, Central University of Jharkhand Title: <i>A short-term assessment of summer and winter velocities of glaciers in the Amery Ice Shelf, Antarctica</i></p> |

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| 1340-1345 | Dr Neelu Singh , National Centre for Polar and Oceanic Research, Goa. Title: <i>Diisopropylnaphthalene in the surface sediments of an Arctic fjord: environmental significance</i> | |
| 1345-1350 | Mr Prashant Pandit , M.Sc. (Geoinformatics) TERI University, New Delhi, India Title: <i>Mapping blue ice areas using multiple indices approach: a case study of Polar Record Glacier, Antarctica</i> | |
| 1350-1430 | LUNCH | |
| 1430-1600 | Session 7: Technological Innovation | |
| Chairs | Dr D K Aswal , <i>Director</i> , National Physical Laboratory (NPL) Dr Rajeev Mehajan , Head SERB | Rapporteur Shri Udhayaraj A D and Dr Shubhang |
| Keynote Speaker 1430-1445 | Dr D K Aswal , <i>Director</i> , National Physical Laboratory (NPL) Title: <i>Quality- Infrastructure of India</i> | |

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| 1445-1500 | Mr Roar Marthiniussen Subsea Division at Kongsberg Maritime, Norway <i>Title: Integrated solutions for Research Vessels including use of Autonomous technology with AUV's and USV's</i> |
| 1500-1515 | Mr Ashwini Gupta, HOD, Department of Scientific and Industrial Research <i>Title: Innovations and Industry Interface in CSIR</i> |
| 1515-1530 | Dr Rajesh Asthana <i>Deputy Director General,</i> Geological Survey of India, Lucknow <i>Title: Challenges during Construction of Bharti: Lessons Learnt</i> |
| 1530-1545 | Dr N Vedachalam, <i>Senior Scientist,</i> NIOT, Chennai <i>Title: Underwater Vehicles for Polar Research</i> |
| 1545-1600 | Mr Emil Grimson <i>Director/Founder,</i> Arctic Trucks International ehf <i>Title: Operational Benefits of 4x4 vehicles over conventional Belt Vehicles in Antarctica</i> |

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| 1600 -1650 | Session 8: New Maitri Station | |
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| Chairs | Dr K N Rai, <i>Former Chief Executive, Defence Research and Development Organisation</i> Dr Javed Beg, <i>Programme Director</i> National Centre for Polar and Ocean Research | Rapporteur Dr Yogesh Ray, Scientist D, ESSO-NCPOR Dr Avinash Kumar, Scientist D, NCPOR |
| Keynote Speakers 1600-1610 | Dr Rasik Ravindra and Dr Javed Beg ESSO-National Centre for Polar and Ocean Research <i>Title: The Alternate Site and Conceptual Design for the New Maitri Station</i> | |
| 1610-1620 | Dr Raghava G <i>Former Chief Scientist & Head CSIR - Structural Engineering Research Centre</i> <i>Title: Structural assessment of the second Indian Research Station Maitri in Antarctica and need for immediate replacement</i> | |
| 1620-1630 | Shri Shree Verma CEO C N Technologies (India) <i>Title: New Maitri Station: Concept Feasibility and conceivability</i> | |
| 1630-1640 | Dr Ajay Dhar Indian Institute of Geomagnetism Navi Mumbai <i>Title: Logistic difficulties in construction of New Maitri Station</i> | |

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| 1640-1650 | Mr Joseph Silveira <i>Ex. Chief Engineer(i/c), National Centre for Polar and Ocean Research</i> Title: <i>The Bharati Experience and Reconstruction of Maitri 2</i> | |
| 1650-1705 | TEA | |
| 1705-1750 | Session 9: Manning Expedition | |
| Chairs | Dr Vijay Kumar, <i>Scientist G,</i> Ministry of Earth Sciences Dr Ekatarina Kim, <i>Associate Professor</i> Norwegian University of Science and Technology | Rapporteur Ms Anulekha Prasad, and Ms Rajoli Ghosh |
| Keynote Speaker 1705-1720 | Dr Javed Beg, <i>Programme Director,</i> National Centre for Polar and Ocean Research Title: <i>A Peep into logistics operations in Antarctica</i> | |
| 1720-1730 | Dr Anoop Tiwari <i>Scientist E,</i> National Centre for Polar and Ocean Research Title: <i>Indian Polar Stations, Environmental Protocol and Challenge in Introduction of Treatment System and Advance Monitoring Instruments.</i> | |

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| 1730-1740 | Dr Pradip Malhotra <i>Director</i> , Life Saving Society of India Title: <i>Value of Detailed Medical check- up and Pre Antarctic Training in National Antarctic Expedition</i> |
| 1740-1750 | Dr Yogesh Ray <i>Scientist D</i> , National Centre for Polar and Ocean Research Title: <i>The Science of Logistics: Insight to logistical challenges faced during 37th ISEA</i> |
| 1750-1820 | Valedictory Session |
| Chairs | Dr P S Goel , <i>Raja Ramanna Professor</i> , IAS, Indian Space Research Organisation Dr B. Meenakumari , Former Chairperson, National Biodiversity Authority |
| Panellists | Dr D K Aswal , <i>Director</i> , National Physical Laboratory Dr Nalan Koc , <i>Director</i> , Norwegian Polar Institute, Tromso Dr M Ravichandran , Director, National Centre for Polar & Ocean Research Dr Uttam K Sinha , <i>Research Fellow</i> at Nehru Memorial Museum Dr Rasik Ravindra , Former Director- National Centre for Polar and Ocean Research |

CSIR-National Geophysical Research Institute (Council of Scientific & Industrial Research)



Established in the year 1961, the CSIR-National Geophysical Research Institute (NGRI), Hyderabad is a premier earth science research institute of the Council of Scientific & Industrial Research (CSIR) under the Ministry of Science & Technology, Government of India. As per its mandate, the institute has been carrying out innovative basic and applied research encompassing the broad disciplines of Geology, Geophysics, Geochemistry & Geochronology. Its multidisciplinary earth science research programs are in tune with the mission of the CSIR and frontier global challenges.

Our Core R & D Strength(s):

- Exploration of Hydrocarbons, Minerals and Groundwater
- Seismology, Earthquake Hazard Assessment & Earthquake Processes
- Understanding the Structure, Dynamics & Evolution of the Indian Lithosphere

Our aim is to:

- Develop new and novel technologies for exploration as well as harnessing of natural resources (hydrocarbons, minerals and groundwater), often in complex and challenging geological settings
- Provide a realistic assessment of natural hazards like earthquakes to the Indian society
- Provide comprehensive understanding of shallow and deep earth processes
- Assess the anthropogenic and geogenic pollution, management and control strategies, especially with regard to potable water and environmental safety

Unique Services and Facilities for:

- Groundwater Exploration
- Mineral Exploration
- Gas Hydrates and Hydrocarbon Exploration
- Environmental Monitoring
- Geotechnical Investigations
- Shallow Sub-surface Exploration
- Active Crustal Deformation
- Deep Earth Probing Geochemistry and Geochronology
- Geophysical Observatories

Towards Water Security:

- Groundwater Exploration for Potable Water at ~ thousand problematic areas across the country
- Leadership Role in Ground and Heli-borne Geophysical Surveys for Water and Mineral Exploration

Towards Energy Security:

- Delineated thick Mesozoic sediments hidden underneath Deccan Volcanics in Saurashtra and Kutch regions leading to new oil and gas targets
- Quantitative estimate of methane in the form of gas-hydrates and free-gas for Indian offshore regions
- Undertaken R & D program for exploration of coal, coal-bed methane (CBM) and uranium
- Exploration for geothermal energy at Tapoban and Tattapani power generation under NGRI-NTPC collaboration

Earthquake Monitoring and Hazard Assessment:

- Real time monitoring of earthquakes in High Risk Areas through networks of broadband seismological stations leading to lowering the thresholds in detection
- Earthquake hazard assessment of major cities in seismic zone 4 and 5 and for strategic installations such as nuclear power stations and dams
- Active participation in the MoES initiative of Deep Drilling Program (upto 7 km) into the Koyna-Warna Earthquake Hypocentral Zone for understanding basic reservoir triggered seismicity

Understanding the Geodynamics & Evolution of Indian Lithosphere:

- Active and passive seismology for structure of the Indian lithosphere
- Simulation of Core & Mantle Dynamic Mathematical Modeling
- Ground, Airborne and Satellite based Earth Observations for assessment of tectonic displacements along major deep faults
- Reconstruction of Lithospheric Evolution through Paleomagnetic, Geochronology, Stable and Radiogenic Isotope Geochemistry

For more information please contact:

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Phone: +91-40-23434600 & 2701 2000; Fax: + 91-40-23434651 & 27171564

e-mail: director@ngri.res.in ; Website: www.ngri.org.in

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**Norwegian
Embassy
in India**



Norway with its extensive scientific and technical capabilities has always been ahead when it comes to polar research in the global arena. Norwegian polar researchers have been publishing world-class research on the myriad changes taking place in the Arctic. Svalbard, a Norwegian archipelago between mainland Norway and the North Pole plays an essential role as a research platform. The areas where Norway spearheads research include climate system, ecosystem and biogeochemical environment. It also focuses on the glacier and ice-sheet dynamics and marine ecosystems in Antarctica. Research on wide-ranging environmental changes and commercialization of the polar regions are areas where the Norwegian Embassy engages with India, leading well-coordinated and scientific national and international polar research programmes. The Norwegian polar research embarked on a new era in 2018 with the development of a state-of-the-art 100 m long ice-breaker vessel Kronprins Haakon, which is amongst the most advanced vessels in the world. This ship with its remotely operated vehicle (ROV) is yielding highly nuanced and stunningly detailed information about little known facts in the polar waters.



**Ministry of
Earth Science
Government of India**



The Ministry of Earth Sciences (MoES), formerly known as the Department of Ocean Development (DOD) was established in 1981 with the mandate to create a deeper understanding of the oceanic regime of the northern and central Indian Ocean and also developed technology and technological aids for harnessing resources and understanding of various physical, chemical and biological processing in the icy realms of Arctic and Antarctic in 2006. Indian Meteorological Department (IMD), established in 1876 to provide meteorological agencies and services to the country was integrated with MoES by bringing meteorological agencies and ocean development department under one umbrella considering the importance of ocean atmospheric interfaces. The MoES, aims at looking at the planet in the holistic way in as much as understanding of the interplay of earth dynamics and systems phenomenon.



**National Centre
for Polar and Ocean
Research**



National Centre for Polar and Ocean Research (NCPOR, erstwhile NCADR) is an autonomous body under the Ministry of Earth Sciences, Government of India situated in Goa. The mandate of the Centre is to plan, promote, coordinate and implement scientific research in the polar regions and the surrounding realms. Besides organising expeditions, NCPOR also maintains the Indian research bases in Antarctica (Maitri and Bharati), Arctic (Himadri) and Himalayas (Himansh). Through the national polar programmes, the Institute promotes the multi-institutional and multi-disciplinary approach to enhance the quality of Indian polar research, including that in the Southern Ocean. NCPOR spearheads research on paleoclimatology (using ice and sediment cores), teleconnection between polar regions and tropics, polar biology, remote sensing, sea-ice interactions, polar environment, Southern Ocean studies, etc. Apart from shelf processes, NCPOR is also the nodal agency for geo-scientific studies which include the Extended Continental Shelf Programme.

mapping Indian Exclusive Economic Zone, Deep Sea Exploration (Hydrothermal and Polymetallic Nodules) to harness the ocean's non-living resources, understanding Indian Ocean Geoid Low and the International Ocean Discovery Programme.



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**National Biodiversity
Authority**

CMLRE

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IITM



CNTech.

ORGANIZER



LIGHTS



Learning in Geography, Humanities, Technology and Sciences (LIGHTS) began in 2003 with the view to establish platforms for discussions and documentations on development and environment discourse. LIGHTS works as a research and analysis unit to promote independent thinking among its stakeholders. LIGHTS helps in the creation of original and high quality documents by undertaking field studies and organizes academic dialogues which it envisages will pave the way toward equal access and opportunity.

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