



MANAGING THE POLAR OCEANS

WEBINAR ON

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SaGHAA

The SaGHAA Webinar People

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The Prelude

The present Webinar by Science and Geopolitics of the Polar Regions Himalaya-Arctic-Antarctic (SaGHAA) is being held with an objective to continue our efforts toward developing a synergy in the geopolitics and scientific studies of earth-atmosphere and ocean processes in the three regions of the earth. This will help us to further and update our understanding of the processes that influence the variability in polar climate and influence our monsoons at millennial, decadal or even annual scales.

It is well known now that the thermohaline circulation which originates in the North Atlantic and southern Arctic is a major force driving not only the oceanic circulation but also regulating the global climate. A link between cold episodes in the North Atlantic and weakened Asian monsoon during the last glacial period has indicated the links between Asian monsoons. Scientists have also observed that deficient monsoon years were preceded by more than normal sea-ice extent and vice versa. Scientists from all over the world have braved the vagaries of harsh Polar climate and added greatly to the international scientific knowledge of these areas. India's interest in Polar Regions is essentially driven by these links as also by our past geological connection and relative position in the Gondwana supercontinent and its amalgamation and fragmentation.

SaGHAA has been institutionalised to synergise research of several institutions and universities that are active in Cryosphere studies in India. The active participation of a wide spectrum of scientists, administrators and students reflects growing concern of the nation towards response of climate change on glaciers and icecaps world over. Integrated Ocean Management (IOM) the Southern and the Arctic Ocean, keeping in mind the sustainable development in these regions, is becoming a prime concern of mankind and hence the focus on Polar Oceans in the present Webinar.

SaGHAA has been successful in bringing eminent leaders, bureaucrats and scientists working in diverse subjects such as glacial, environmental, social and political fields together in the Webinar on 'Managing the Polar Oceans Sustainably', to add to the better understanding of the issues involved and give relevant advice to policy makers.



(Sulagna Chattopadhyay)
Convener
SaGHAA Webinar 2020



(Rasik Ravindra)
Chairman, Organising Committee
SaGHAA Webinar 2020



The SaGHAA Webinar Book

Managing the Polar Oceans

CHIEF GUEST



HE ÓLAFUR RAGNAR GRÍMSSON
FMR PRESIDENT, ICELAND

HE Ólafur Ragnar Grímsson
*Former President, Iceland
Chairman, Arctic Circle.*

Serving as President of Iceland for twenty years, 1996-2016, Grímsson was elected five times in nationwide elections. Previously, he was Minister of Finance, Member of Parliament, Member of the Parliamentary Assembly of the Council of Europe, and the first Professor of Political Science at the University of Iceland. Grímsson now serves as Chairman of the Arctic Circle, which he founded in 2013 with various Arctic partners. The Arctic Circle Assembly held in Iceland every October has become the largest annual international gathering on the Arctic, attended by more than 2000 participants from 60 countries. The Arctic Circle also organises specialised Forums in other countries; so far, in Asia, Europe, and North America.

For decades, Grímsson has been an active participant in the global climate dialogue and during his Presidency and in recent

years initiated and promoted clean energy projects in Asia, Africa, the Middle East, Europe, the United States and the Americas; especially using Icelandic achievements and technologies as a model. Cooperation with Sinopec has led to the largest geothermal projects in the world, building clean energy urban heating systems in a multitude of Chinese cities. He was the Chairman of a commission established by IRENA on the new geopolitics emerging from global renewable energy transformation. Grímsson served on the Advisory Board of Sustainable Energy for All, created by the United Nations and the World Bank. In addition to devoting his post-presidential efforts to the three areas of climate, the Arctic and clean energy, Grímsson is also involved in international cooperation on the oceans and the evolution of sustainable use of marine resources.

GUEST OF HONOUR



MP JAMES GRAY
HOUSE OF COMMONS, UNITED KINGDOM

Parliamentarian James Gray
*House of Commons,
United Kingdom.*

A Conservative Party member in the UK Parliament for North Wiltshire. Gray was elected to the House of Commons as Member for the North Wiltshire constituency in 1997. In 2015 and then again in 2019 he was re-elected MP for the same constituency. Gray is a graduate of the Royal College of Defence Studies and Armed Forces Parliamentary Scheme. He has a great interest in a wide spectrum of Polar matters and has been the Chairman of the All Party Parliamentary Group (APPG) for the Polar Regions since 2010. This group arranges events in Parliament attended by up to 100 Parliamentarians and a large audience from the wider Polar community in London and Cambridge. Gray has also led APPG Expeditions to Svalbard (2017), Greenland (2018), Iceland (2019), and led the Armed Forces Parliamentary Scheme members on visits to the Royal Marines Training, Arctic Norway (2010, 2012) to help increase awareness about the regions. He arranged two international conferences at the Royal United Services Institute, the first being

in 2013: Poles Apart and then 2019: Inaugural Conference of Antarctic Parliamentarians. Gray represented the UK at the Annual Arctic Circle Conferences in Reykjavik, the Arctic Parliamentarians Conferences in Ulan Ude, Siberia, (2017) and Inari, Arctic Finland, (2019). He Attended Russian Arctic Conference, Archangelsk, (2017) and Russian Economic Forum, St Petersburg where he spoke at the Arctic Seminar. Gray chaired the Commons Defence Committee's enquiry into Defence in the Arctic in 2017 and led a trip to Arctic Norway. He was a member of the NATO Parliamentary Assembly Enquiry into Defence in the Arctic in 2018 (Sweden and Iceland) and was a guest of the Governor of the Falkland Islands in a visit to South Georgia aboard Pharos (2018). Gray is an acclaimed author and has published several books including Futures and Options for Shipping, for which he was awarded the Lloyd's of London Book Prize, Crown vs Parliament, Poles Apart (2014), Who Takes Britain to War? (2016), and most recently the Full English Brexit (2018).

SPECIAL GUEST



MS HILDE SVARTDAL LUNDE
SENIOR ARCTIC OFFICIAL, NORWAY

Hilde Svartdal Lunde

*Senior Arctic Official,
Ambassador for the Arctic and Antarctic,
Ministry of Foreign Affairs, Norway.*

Currently serving as the Ambassador for Arctic and Antarctic Affairs at the 2020 Norwegian SAO, Lunde studied Political Science at the University of Oslo. Her career has spanned over 25 years in which she has served in different positions such as being the Ambassador to Reykjavik from 2018-2020, Deputy Director-General, Department of Security Policy and the High North, Ministry of Foreign Affairs, Oslo from 2014-2018, Senior Faculty Adviser, The Norwegian Defence College, Oslo from 2013-2014. She was the Senior Adviser, Section for East Asia and Oceania, Ministry of Foreign Affairs from 2011-13. She has worked in different capacities at different embassies such as Deputy Chief of Mission, Royal Norwegian Embassy, Moscow from 2007 to 2011. She

was also the Deputy Director, Section for Russia, Eurasia and Regional Cooperation from 2002 to 2007. Lunde started her career as an Executive officer at Norwegian Defence Command in 1992. In 1993 she was appointed as Trainee/higher executive officer, Ministry of Foreign Affairs. She started her diplomatic career in the year 1995 as an Attaché at Royal Norwegian Embassy, Moscow. She became the second secretary the next year in which capacity she served till 1998. She then moved to the US to serve as the First Secretary from 1998 to 2001. She was also the Counsellor at the Royal Norwegian Embassy, Belgrade (Pristina) from 2001 to 2002. She has had diverse experiences across continents.

SPECIAL GUESTS



HE MR HANS JACOB FRYDENLUND
AMBASSADOR ROYAL NORWEGIAN EMBASSY

HE FREDDY SVANE
AMBASSADOR ROYAL DANISH EMBASSY



HE Hans Jacob Frydenlund

*Ambassador to India,
Royal Norwegian Embassy.*

Presently the Norwegian Ambassador to India, Frydenlund, before coming to India was the Director for UN Policy in the Norwegian Ministry of Foreign Affairs. Frydenlund has served in Chile, at the Norwegian Mission to the European Union in Brussels, at the Norwegian Mission to the United Nations in New York and has been Norwegian Representative to the Palestinian Authority. He has worked for thirteen years in different capacities with conflict resolution in Africa. He has been Press Spokesman for International Development in the Ministry. Frydenlund grew up in Oslo and is an economist by education.

HE Freddy Svane,

*Ambassador to India,
Royal Danish Embassy.*

Joining the Danish Foreign Service in the year 1982 Svane served as the Secretary of Embassy, Permanent Mission to the EC, Brussels from 1988-1991. He served as the Head of section, Ministry of Foreign Affairs from 1991-1993. Prior to that Svane worked in various capacities such as Counsellor (Economic Affairs) Paris, Head of North Group's 3rd department, General manager, A.P. Møller, Under-Secretary of the Trade Council, Ambassador, Ministry of Foreign Affairs (Trade Policy and Globalization) over the next decade. He was appointed as the Ambassador to Japan from 2005 to 2008 and then the CEO of the Danish Agricultural Council from 2008-2010. In 2010 he was the Ambassador, Ministry of Foreign Affairs (EU/EPA). Svane was first appointed as the Ambassador to India, Bhutan, Sri Lanka and the Maldives from 2010 to 2015. He became Ambassador to Japan for a second term from 2015 to 2019 and is currently the Ambassador to India, Bhutan, Sri Lanka, Maldives and Nepal. Svane is an alumni of the Copenhagen University.

KEYNOTE ADDRESS



PROF VICTOR SMETACEK

DR S W A NAQVI



Prof Victor Shahad Smetacek

*Prof Emeritus, Alfred Wegener Institute,
Germany.*

Professor Emeritus for Bio-Oceanography at the University of Bremen and former Head of the Division Pelagic Ecosystems at the Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research (AWI) Smetacek is an expert on plankton ecology and biogeochemistry, particularly of the Southern Ocean. His research interests are focussed on the relationship between plankton ecology, ocean biogeochemistry and climate. Smetacek served as Chief Scientist

on numerous interdisciplinary, international cruises onboard RV 'Polarstern' the last three of which carried out iron fertilisation experiments in the Antarctic Circumpolar Current. He has served on International Scientific Steering Committees of various research programmes, on the Scientific Councils of institutions in Germany and abroad and has received several prestigious awards for excellence in research, including the Pravasi Bharatiya Samman Award 2012.

Dr S W A Naqvi,

*Distinguished Scientist,
Council of Scientific & Industrial Research.*

With a research interest in the area of multidisciplinary oceanography of the Indian Ocean including its marginal seas (the Red Sea and the Andaman Sea) and the Indian sector of the Southern Ocean, hydrography, and water masses, Naqvi has made significant scientific contributions. In recognition of this, he has received a large number of awards/recognitions including the CSIR Young Scientist Award (1987), MAAS Young Scientist Award (1989), Shanti Swaroop Bhatnagar Prize (1996), Vigyan Ratna by the Uttar Pradesh Government (2004), National Award for Ocean Science & Technology by the Ministry of Earth

Sciences, Government of India (2013), PSN National Award for Excellence in Science & Technology, HN Siddiquie medal by the Indian Geophysical Union (2014), Sisir Kumar Mitra Memorial Award by the Indian National Science Academy (INSA) (2015), and National Geosciences Award for Excellence (2018) by the Ministry of Mines, GoI. He is a fellow of the National Academy of Sciences, India, Indian Academy of Sciences, Indian National Science Academy, and Third World Academy of Sciences. He has also been selected as a Geochemistry Fellow by the Geochemical Society (USA) and the European Association of Geochemistry in 2020.

The SaGHAA Webinar The Sessions

SESSION 1 | PANEL DISCUSSION | CLEAN AND HEALTHY OCEANS



CHAIR
DR SHAILESH NAYAK
DIRECTOR, NIAS

PROF SUNIL K SINGH
DIRECTOR, NATIONAL INSTITUTE OF OCEANOGRAPHY

DR PUSHP BAJAJ
ASSOCIATE FELLOW, NATIONAL MARITIME FOUNDATION

DR OLE ARVE MISUND
NORWEGIAN POLAR INSTITUTE, NORWAY

PROFESSOR KATHERINE RICHARDSON
UNIVERSITY OF COPENHAGEN, DENMARK

Dr Shailesh Nayak
Director,
National Institute of Advanced Studies.

Currently is the Director of the National Institute of Advanced Studies, Bengaluru and Chancellor of the TERI School of Advanced Studies, Nayak was the prior 'Distinguished Scientist' in the Ministry of Earth Sciences and President, International Geological Congress during 2015-2017. He was the Secretary, Ministry of Earth Sciences, Government of India, during August 2008-2015, and provided leadership for programmes related to earth system sciences. He has been credited with launching many research programmes related to the monsoon, air-sea interaction, changing water cycle, atmospheric chemistry, coastal vulnerability, climate services and polar science. Nayak had chaired National Committee on SCAR during 2016-19. He had set up the state-of-the-art tsunami warning system for the Indian Ocean in 2007 in just two years time and providing tsunami advisories to the Indian Ocean rim countries. Nayak pioneered in the development of algorithms and methodologies for the application of remote sensing to the coastal and marine environment and generated baseline database of the Indian coast and developed services for fishery and ocean state forecast. The generation of detailed

information on the Indian coast has influenced the development of policy for zoning of coastal zone for regulating coastal activities. He was conferred the prestigious ISC Vikram Sarabhai Memorial Award 2012, Bhaskara Award for 2009, Fellowship of the International Society of Photogrammetry & Remote Sensing (ISPRS) and Academician of the International Academy of Astronautics (IAA) for his outstanding contributions in remote sensing and GIS.

Prof Katherine Richardson
University of Copenhagen,
Denmark.

A professor in biological oceanography at the University of Copenhagen, leader of the Sustainability Science Centre and a principal investigator in the Center for Macroecology, Evolution and Climate, Richardson's research focuses on the importance of biological processes in the ocean for the uptake of CO₂ from the atmosphere. She also studies how the ocean biology, including diversity, contributes to ocean function in the Earth System. Richardson was the Chairman of the Danish Commission on Climate Change Policy that reported in 2010 and presented a roadmap for how Denmark can become independent of fossil fuels by 2050. She is at present a member of the Danish Climate

Council and was a member of the 15 people Independent Group of Scientists appointed by Ban Ki-Moon to draft the 2019 UN Global Sustainable Development Report.

Prof Sunil Kumar Singh
Director,
CSIR-National Institute of Oceanography, Goa.

With a research interest in elemental and isotope geochemistry Singh played a significant role on studies on low temperature elemental and isotope geochemistry and his researches have assisted in widening the understanding on the evolution of the Himalaya and its role in modulating the long-term global climate. Singh's present research interests are Biogeochemistry of Trace Elements and Isotopes (TEIs) in the Indian and Southern Oceans and in the Indian Estuaries and evolution of ocean chemistry and atmospheric oxygen. Currently, he is leading the GEOTRACES-INDIA programme to unravel the importance of micronutrients in controlling the ocean productivity, marine ecology and global climate change. Singh is a recipient of the Shanti Swarup Bhatnagar award, one of the highest Indian science awards for his contributions to Earth, Atmosphere, Ocean and Planetary Sciences in 2016. He received the National Geosciences Award (2012) and The Eminent Mass spectrometry Award, 2014.

Ole Arve Misund
Norwegian Polar Institute, Norway.

Currently serving as the Managing Director of the Norwegian Polar Institute, taking charge in 2017, Misund has solid management and research experience of over 30 years. He has been the head of a number of important research institutions in recent decades such as The Managing Director at National Institute of Nutrition and Seafood Research from 2016 to 2017, Director of University Centre in Svalbard (UNIS) from 2012 to 2017, Research Director at the Institute of Marine Research in Norway from 2000 to 2012. Over the years through various leadership roles in the research and education sector, Misund has emphasised that the institutions he led should have a good academic collaborations with various universities and institutes of higher learning. He has published over 80 papers related to marine research in his career and is an alumnus of the The University of Bergen.

Dr Pushp Bajaj
Associate Fellow,
National Maritime Foundation.

An Associate Fellow at the National Maritime Foundation in New Delhi, Bajaj is studying the impacts of climate change on India's holistic maritime security. Prior to joining the Foundation, Bajaj worked as an independent science writer and researcher focusing on climate change and the environment where he published several articles on sustainable development, climate science, climate policy, and related areas. Bajaj received his PhD in Chemistry from the University of California, San Diego, USA, where he was a graduate student researcher for the NSF-funded Center for Chemical Innovation - Center for Aerosol Impacts on Chemistry of the Environment based in San Diego, CA, USA. ■

SESSION 2 | PANEL DISCUSSION | POLAR OCEANS - WEATHER AND CLIMATE



CHAIR

DR M N RAJEEVAN, SECRETARY,
MINISTRY OF EARTH SCIENCES

DR RAVICHANDRAN,
DIRECTOR, NCPOR, GOA

**DR LASSE
PETERSSON**,
NERSC, NORWAY

DR NALAN KOÇ,
RESEARCH DIRECTOR,
NPI, NORWAY

DR ÅSA LINDGREN, HEAD,
SHIP BASED RESEARCH
SUPPORT, SPRS, SWEDEN

Dr M N Rajeevan

Secretary to the Government of India, Ministry of Earth Sciences, New Delhi.

Contributing significantly in developing several application tools and prediction models for societal applications like long-range prediction models, gridded climate data sets, and diagnostic studies on the Inter-annual variability of southwest and northeast monsoons (teleconnections) for regional climate services Rajeevan's work are being utilised by the India Meteorological Department for operational use. His current research interests include monsoon prediction using coupled models, decadal variability and prediction, land surface processes and monsoon predictability (role of land surface processes on monsoon variability and prediction), extreme climate events. Rajeevan is the recipient of 2001 START Young Scientist Award, Young Scientist Award in Atmospheric Sciences by the Ministry of Earth Sciences (MOES) in 2007, 20th Biennial Mausam Award (2001) by Department of Science and Technology and many others. He is member of several international and national bodies including International Academy of Astronautics (IAA) High-level Adviser on Climate Services for the Commission on Climatology,

WMO; Chairman, Council of the Regional Integrated Multi-Hazard Early Warning System (RIMES) for Africa and Asia, Bangkok.

Dr M Ravichandran

Director of the National Centre for Polar and Ocean Research Goa.

The current Director of the National Centre for Polar and Ocean Research, Ravichandran has worked as a scientist in Indian Institute of Tropical Meteorology (IITM) in the field of Atmospheric Science, National Institute of Ocean Technology (NIOT) in the field of Ocean Observing System and Indian National Centre for Ocean Information Services (INCOIS) in the field of ocean observing system and ocean modelling. His research interests include atmospheric physics and ocean dynamics, ocean observing systems and ocean modelling among others. He is a member of Scientific Steering Group of the WCRP (CLIVAR). Ravichandran is also the current Vice-Chair of the Scientific Committee on Antarctic Research (SCAR) and Fellow of the National Academy of Sciences, India. He has several publications in peer reviewed journals of national and international repute. Ravichandran is the recipient of the National Award for Ocean Sciences and Technology.

Lasse H Pettersson

*Research coordinator
Nansen Environmental and Remote Sensing Center, Bergen, Norway.*

A research coordinator responsible for international cooperation at the Nansen Environmental and Remote Sensing Center, Bergen, Norway, Pettersson is a physical oceanographer. His particular research interests are in the study and monitoring of marine ecosystems, harmful algae blooms and water quality in the Arctic and temperate oceans. Pettersson has more than 35 years of experience with research and applications of satellite earth observation data for marine and sea ice environmental and climate studies and applications. He built up and led the marine and coastal optical remote sensing research and services at the Nansen Center for several years. Pettersson has extensive experience in international project management and cooperation funded by the Research Council of Norway, European Commission, European Space Agency, industry and other agencies. He has been responsible for the scientific dissemination and outreach activities at NERSC for over 15 years and has published several significant works. He has extensive experience in international scientific and educational cooperation, in particular with Russia (since 1992), with India (1998) and Bangladesh (2011). Since the 1990s he has been coordinator, deputy coordinator or participant in several national and international funded research and educational projects, including the co-coordinator of European Commission FP7 INCOLAB project Indo-European research facilities for studies of marine ecosystem and climate in India (INDO-MARECLIM), led by the

Nansen Environmental Research Centre-India. Pettersson has coorganised and lectured at many international interdisciplinary postgraduate research schools in Norway, Russia, India, Bangladesh and China.

Dr Åsa Lindgren

*Head, Ship Based Research Support,
SPRS, Sweden.*

Head of Department of the Ship-based Science Support at the Swedish Polar Research Secretariat Lindgren holds a PhD in Arctic Ecology and has worked in the Polar Regions for several years with science and logistic science support.

Dr Nalan Koç

Research Director at the Norwegian Polar Institute, Norway.

Serving as the Research Director at the Norwegian Polar Institute (NPI) since September 2011 Koç is also an adjunct professor at the University of Tromsø. She received her doctoral degree in marine geology/palaeoceanography from the University of Bergen in 1993 and qualified as a professor in 2003. Nalan has over 20 years of experience with climate interpretations from polar marine sediment cores and has participated and led many cruises in the Nordic Seas, Arctic Ocean and the Southern Ocean and also participated in several ODP and IODP cruises. She has extensive experience in polar climate research and management through her previous positions at NPI as leader of the Polar Climate Programme (2004-2009) and as head of Centre for Ice, Climate and Ecosystems (ICE), NPI (2009-2011) and in her present position as research director. Koç has also served in several international science panels (i.e. CLIVAR, PAGES, ESSAC). ■

SESSION 3 | PANEL DISCUSSION | MARITIME JURISPRUDENCE



CHAIR
VICE ADMIRAL PRADEEP CHAUHAN, DIRECTOR GENERAL, NATIONAL MARITIME FOUNDATION

DR R RAVINDRA, FMR DIRECTOR, NCPOR

DR PAULA KANKAANPÄÄ, PAME CHAIR, SYKE, FINLAND

CAPTAIN SARABJEET PARMAR, EXECUTIVE DIRECTOR, NATIONAL MARITIME FOUNDATION

DR M SUDHAKAR, FMR DIRECTOR, CMLRE

Vice Admiral Pradeep Chauhan, AVSM & Bar, VSN, IN (Retd.)
Director-General, National Maritime Foundation, New Delhi.

Currently the Director-General of the National Maritime Foundation, which is India's foremost resource centre for the development and advocacy of strategies for the promotion and protection of India's maritime interests Adm Chauhan has had an illustrious, four-decade-long career in the Indian Navy, with as many as four sea-going commands, culminating in his command of the aircraft carrier, the Viraat. As a Flag Officer, he conceptualised and executed the Indian Ocean Naval Symposium (IONS). Adm Chauhan has been Chief of Staff of the Western Naval Command and the Commandant of the Indian Naval Academy (Ezhimala). He has been commended three times by the President of India for sustained distinguished service. Adm Chauhan is a thought-leader and a prolific writer with over 85 published professional articles and papers to his credit. He is on the visiting faculty of the higher-command establishments of all three of India's defence services, as also tri-Service establishments, including the National Defence College, New Delhi. Adm Chauhan has also been advising the Indian government through his interaction with the ministries of Defence, External Affairs, and the National Security

Council Secretariat.
Dr Rasik Ravindra (Chairman Organising Committee)
Formerly Director, ESSO- National Centre for Polar and Ocean Research (NCPOR), Goa and Member, UN, CLCS.

Holding the position of the Director of NCPOR (formerly NCPOR) between 2006 and 2012 after relinquishing the post of Deputy Director-General in Geological Survey of India, Ravindra is a veteran Antarctic. He has led the Ninth Antarctic Expedition in 1989-91, visiting the icy continent in 1987-88, 1996-97, 2003-04, 2007 and 2009-10 in various capacities. Ravindra has also led the first Indian Expedition to the South Pole, the first Indian Arctic Expedition apart from expeditions to Higher Himalaya in Bhutan. He was Chairman of the DST Programme Monitoring Committee on "Dynamics of Himalayan Glaciers from 2007 to 2012 and was appointed Chair, Panikkar Professor in October 2012 by the Ministry of Earth Sciences. Ravindra has served as a Member of the UN Commission on Limits of Continental Shelf for the term 2014-2017 as also the Secretary General of the 36th International Geological Congress 2019-2020. He has received National Award for Polar Sciences and Cryosphere, 2013, National Mineral Award- 1990, Antarctic Award- 2002, H. N. Siddiqui Gold Medal from IGU in 2011, Prof Prem Bahadur Verma Memorial Lecture award, Prof R C Mishra Memorial Gold Medal 2017 and Dr WD West Oratory Award, 2018 and LifeTime Achievement Award from the Paleontological society of India.

Captain Sarabjeet Singh Parmar
Executive Director, National Maritime Foundation.

A serving Indian Naval Officer, Sarabjeet writes and speaks extensively on maritime security and strategy issues at various national and international conferences. He was a member of the XI Indian Antarctic Summer Expedition in 1991. Sarabjeet has been a Research Fellow at the Manohar Parrikar Institute for Defence Studies and Analyses and also worked in the Indian Navy's strategic apex level offices where, as part of the core team he published the Indian Navy's unclassified maritime security strategy document titled "Ensuring Secure Seas" in 2015. He has carried out regional maritime assessments and has completed the doctrine development plan. Sarabjeet is presently the Executive Director of the National Maritime Foundation and looks at the maritime strategy and security related aspects in the Indo-Pacific, piracy, and international maritime law with a focus on lawfare.

Professor Paula Kankaanpää
PAME Chair, SYKE, Finland.

The Director of the Marine Research Centre of Finnish Environment Institute, SYKE, Kankaanpää currently also leads a multi-sectoral project on Finnish Marine Knowledge and Data Portal < www.MarineFinland.fi >. SYKE operates the Finnish ice strengthened Research Vessel Aranda and hosts the Finnish Marine Ecology Laboratory. She is Chair of Protection of Arctic Marine Environment, PAME -Working Group of the Arctic Council, and Vice President of the International Arctic Science Committee (IASC), a Finnish Delegate of the International Council for the Exploration of the Sea (ICES) and the chair of the Finnish National Committee of Arctic and Antarctic Research. Earlier, Kankaanpää

acted as the Director of the Arctic Centre of the University of Lapland for 15 years since 2000. She was a research fellow at the Dartmouth College in 2010. Kankaanpää worked as a Senior Advisor for the Arctic, Barents and Antarctic cooperation in the Ministry of the Environment in 1991 - 99. She acted as the Deputy Executive Secretary of Arctic Council's CAFF Working Group in Iceland 1998. Kankaanpää obtained her PhD at the Geography Department of the University of Helsinki while working as a scientist in Finnish Marine Research Institute. She also studied in the University of Alaska Fairbanks.

Dr M Sudhakar
Former Director, Centre for Marine Living Resources and Ecology Kochi, Kerala.

Having served two premier research institutions of the country—National Institute of Oceanography (NIO) & National Centre for Antarctic and Ocean Research (NCAOR) in Goa, Sudhakar took charge as Director, CMLRE, Kochi in 2018 till 2020. A veteran oceanographer, he has occupied various positions such as project leader and scientist and has spent more than 1500 days at sea on-board research vessels, as leader of expeditions to the Southern Ocean and Antarctica. He represented India at the Preparatory Commission for the United Nations Law of the Sea (PrepCom) and was an Elected Member of the Legal and Technical Commission (LTC) of the International Seabed Authority (ISBA) for the term 2007-2011 and (2012-16). Sudhakar was also a member of Scientific Committee on Ocean Research (SCOR), ICSU, serving for the second term until 2014. He was a visiting scientist to the Aachen University of Technology, Germany; a resource person of the International Ocean Institute, Malta; Member, National Steering Committee for Science and Astronomy Olympiads and Member, Scientific Committee, International Geological Congress 2020 (to be held in India). He was the 'Commissioner General' of Government of India for the Yeosu (World) Expo 2012 held in the Republic of Korea. ■

SESSION 4 | PANEL DISCUSSION | BLUE ECONOMY



Dr P S Goel

Former Secretary to the Government of India, Ministry of Earth Sciences, New Delhi.

Starting his career with the initiation of Satellite Attitude Control System for spinning RS-1 Satellite at Trivandrum and later moving to Bangalore as part of Arya Bhata Project team, Goel developed various systems for Bhaskara I & II satellites, Rohini series satellites, IRS, V and INSAT-2. Goel has contributed significantly to the mission planning for remote sensing, communication and scientific missions and authored over hundred research papers in refereed journals and conferences. He was Chairman, Spacecraft System Advisory Board for IRS-1, Project engineer AOCS for APPLE and Associate Project Director, INSAT-II. Goel was Head Control System Division, Group Director AOCS, Deputy Director Mission and Control Area, Associate Director of ISRO Satellite Centre (ISAC) and was Director ISAC from 1997 to 2005 and member of Space Commission. Goel moved to Delhi as Secretary, Department of Ocean Development and transformed it into the Ministry of Earth Sciences by integrating Ocean, Atmosphere and Geo Science and Technologies. He was the first Chairman of Earth Commission and then the Chairman of RAC, DRDO and member of National Security

Advisory Board. He was President of Indian National Academy of Engineering (INAE) and Vice President, Aeronautical Society of India, Dr. Vikram Sarabhai Distinguished Professor of ISRO. He was DRDO Chair at RCI/ DRDO Hyderabad, pursuing space for National Security. Goel was awarded Padma Shri in 2001 apart from several other prestigious accolades and titles. Currently, Goel is Honorary Distinguished Professor at ISRO HQ and is in many distinguished panels.

Dr M A Atmanand

Director, National Institute of Ocean Technology (NIOT). Director of National Institute of Ocean Technology (NIOT) Atmanand has done pioneering work in the area of deep-sea technologies in India. He took Masters and Doctorate degrees from the Indian Institute of Technology, Madras and has led a team of engineers for the design and development of an underwater crawler for deep-sea operation. The team developed the in-situ soil tester, which was tested at a depth of 5200 m in the Central Indian Ocean Basin. It was under his supervision that the design of the Electrical, Instrumentation, and Control system of India's first Remotely Operable Vehicle was completed, later tested at a depth of 5289 m underwater. Atmanand's areas of interest include the development of

DR JAN-GUNNAR WINTHER, CENTRE FOR THE OCEAN AND THE ARCTIC, NORWAY

DR SAMEER GUDURU, ASSOCIATE FELLOW, NMF

DR. JOHN KURIAN P, SCIENTIST F, DEEP SEA EXPLORATION & MAPPING, NCPOR

underwater vehicles with specific reference to their control; development of components for deep-sea applications; and development of test protocols for testing of deep-sea devices. He was honoured with the National Award of Excellence in Deep sea Ocean Technology by Ministry of Earth Sciences in 2020, IEEE- Oceanic Engineering presidential Award in 2016, the National Geoscience award in 2010 from the Ministry of Mines, and the International Society for Offshore and Polar Engineers (ISOPE) Ocean Mining Symposium Award - 2009. Atmanand has presented and published more than 140 papers in international journals, international conferences, book chapters, national conferences, and has 8 Indian and one German patent to his credit.

T Armstrong Changsan

Ambassador of India to Iceland.

A career diplomat in the Indian Foreign Service, Changsan has been serving the nation since 1997. He assumed charge as Ambassador of India to Iceland in 2018. Before taking up his present assignment, Changsan was the Consul General of India in Osaka-Kobe, Japan. He has served as Deputy High Commissioner of India to South Africa, and was earlier posted at Indian Missions in Lagos and Tokyo in various capacities. At headquarters, Changsan served in the United Nations Economic and Social Division. He has also served as Director/Head of Ministry of External Affairs' Branch Office and Regional Passport Office, Guwahati.

Sameer Guduru

Associate Fellow, National Maritime Foundation.

Obtained his PhD in the emerging area of Femtosecond Laser Microfabrication from Politecnico Di Milano, Italy, Guduru thereafter held the role of a Research Engineer with Laboratory LP3, Marseille, France in the field of Laser-Induced Forward Transfer, applied in creating microelectronic circuits on flexible substrates. He later pursued Masters in International Relations from Symbiosis School of International Studies, Pune and is now an Associate Fellow with the National Maritime Foundation working in the area of Marine Technology.

Dr John Kurian

Senior Scientist, Deep Sea Exploration and Mapping, National Centre for Polar and Ocean Research.

With interest that include hydrothermal sulphide mineral exploration, mid-ocean ridge tectonics, geomorphology and morpho-tectonics, Kurian presently works as a scientist at NCAOR-Goa and is leading national programmes on hydrothermal sulphides exploration in Indian ocean ridges and geoscientific studies of the Indian EEZ. Kurian has extensive field experience in leading geoscientific cruises onboard research vessels as chief scientist of several marine cruises for exploration of marine mineral resources in the deep-ocean mid-ocean ridges of Indian Ocean as well as for the geoscientific mapping of the Indian EEZ. He was instrumental in identification of many potential zones of hydrothermal mineralisation in the Indian Ocean ridges and as well as for mapping many geomorphological features in the Indian EEZ region. Kurian has published more than 30 research articles in various national

and international peer-reviewed journals. He is India's national representative in the InterRidge, an international organization dealing with mid-ocean ridge research. He has represented India in many annual meetings of the International Seabed Authority as well as state parties meeting of UNCLOS.

Dr Jan-Gunnar Winther

Director Centre for the Ocean and the Arctic, Nofima & Specialist Director, Norwegian Polar Institute.

As director of Centre for the Ocean and the Arctic at Nofima from 2018, and as a specialist director at the Norwegian Polar Institute (NPI) from 2017, Winther's areas of interest includes oceans and the sustainable development of the Arctic through multilateral cooperations. He is also the Chair of the Board of GRID Arendal from 2017. Winther took the role of the Adjunct

Professor at École Polytechnique Fédéral de Lausanne (EPFL) in 2017. He was also the Adjunct Professor at the University Centre in Svalbard from 2002-2007 and Leader course at the Norwegian National Defense College, 2003-2013. Winther serves on a number of national and international committees and delegations including deputy chair of the Norwegian Government's Expert Committee on Northern Regions Policies, national expert to the Arctic Council and the Antarctic Treaty Consultative Meetings, Lead Author on IPCC's AR5, member of the Norwegian Academy of Technological Sciences, the World Economic Forum, United Nations Global Compact Action Platform for Sustainable Ocean Business, China Council for International Cooperation on Environment and Development, expert to the High-Level Panel on Sustainable Blue Economy and the Explorers Club. Winther is an alumni of the Norwegian Institute of Technology (NTH). ■



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