Nansen Group: ”Summer/Winter” Research Schools

- *INCOIS-Nansen-NANSI-NERCI-2016,* ***Hyderabad, India****:*
  Operational Oceanography: Indian Ocean circulation and sea level variation
  Participation: 32 students and 16 lecturers
- *Nansen-NANSI-NVP-2015,* ***Svalbard****:*
  Arctic Ocean Governance as a Multifunctional Challenge
  Participation: 23 students and 16 lecturers
- *NTC-NERSC-2014,* ***South Africa****:*
  Ocean, Climate and Marine Ecosystem: A focus on the Agulhas Current, the Benguela upwelling system and the Tropical Atlantic
  Participation: about 32 students and 25 lecturers
- *NABIC-NANSI-BCAS-NERSC-2014, Cox´s Bazar,* ***Bangladesh****:*
  Coastal and Ocean processes of the Bay of Bengal and its impact on the society
  Participation: 29 students and 14 lecturers
- *NIERSC-NERSC-2014, Repina,* ***Russia*** *(FP7-INCO EuRuCAS)*
  Land Hydrology and Cryosphere of the Arctic and Northern Eurasia in the changing climate
  Participation: 27 students and 18 lecturers
- *Nansen-Zhu, ResClim and Impact2C-2014, Rosendal,* ***Norway****:*
  Regional Climate Impact
  Participation: 40 students and lecturers
- *Nansen-NANSI-NVP-2013,* ***Svalbard****:*
  Shipping in Arctic Water: The interaction of sea ice, ship technology, climate change, economy and other operational conditions
  Participation: 30 students and 15 lecturers
- *NERCI-NERSC-2013,* ***Cochin, India*** *(FP7-INCO Indo-MareClim):*
  Climate change, marine ecosystem and coastal zone management
  Participation: 30 students and 24 lecturers

NERSC

Operational Oceanography: Indian Ocean circulation and sea level variation: A Indo-Norwegian winter school initiative

by

ITCOocean,

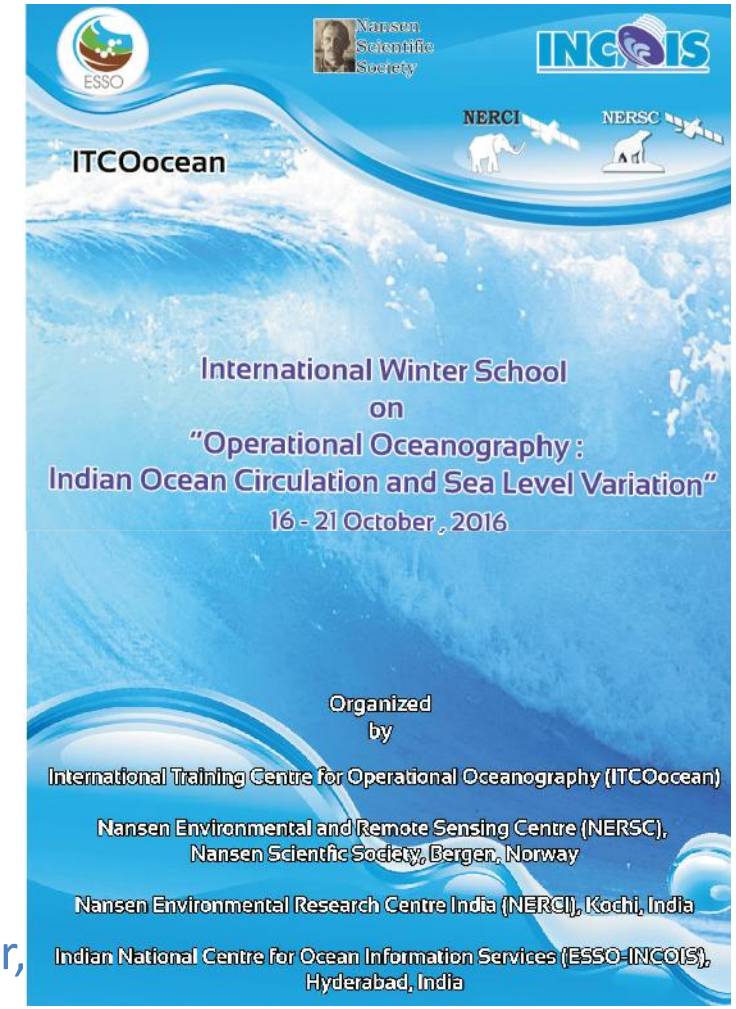
Indian National Centre for Ocean Information Services, Hyderabad

Nansen Environmental Research Centre -India, Cochin

Nansen Scientific Society

and

Nansen Environmental and Remote Sensing Center, Norway



NERSC


NERSC

Nansen Environmental and Remote Sensing Center (NERSC)

an independent research foundation in Bergen, Norway
established in 1986 -
affiliated with the University of Bergen
a national Norwegian environmental research institute

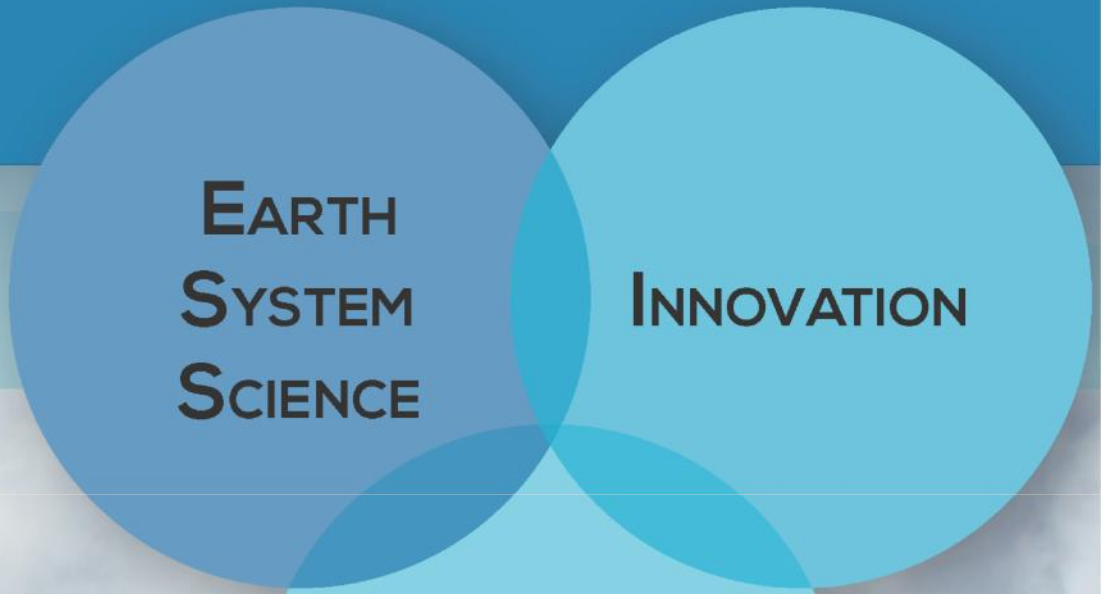
Lasse H. Pettersson

Partner in:

VISION

Pioneer understanding of the Earth system and science based innovation for society.

RESEARCH



Our priorities are aligned with national and international research strategies and development programs, combining Earth system science, innovation and services.

Earth System Science

is conducted through multidisciplinary research across short term to multi decadal time scales, including:

- Ocean processes and interactions with the marine ecosystem
- Sea ice physics
- Boundary layer dynamics
- Climate variability, teleconnections and predictability

Innovation

is essential for progress in Earth system sciences and service development and their exploitation in accordance with stakeholder requirements. We apply and integrate:

- Satellite remote sensing
- Numerical modelling
- Data assimilation
- Acoustical oceanography
- Observing system design and optimization
- Data handling and integration

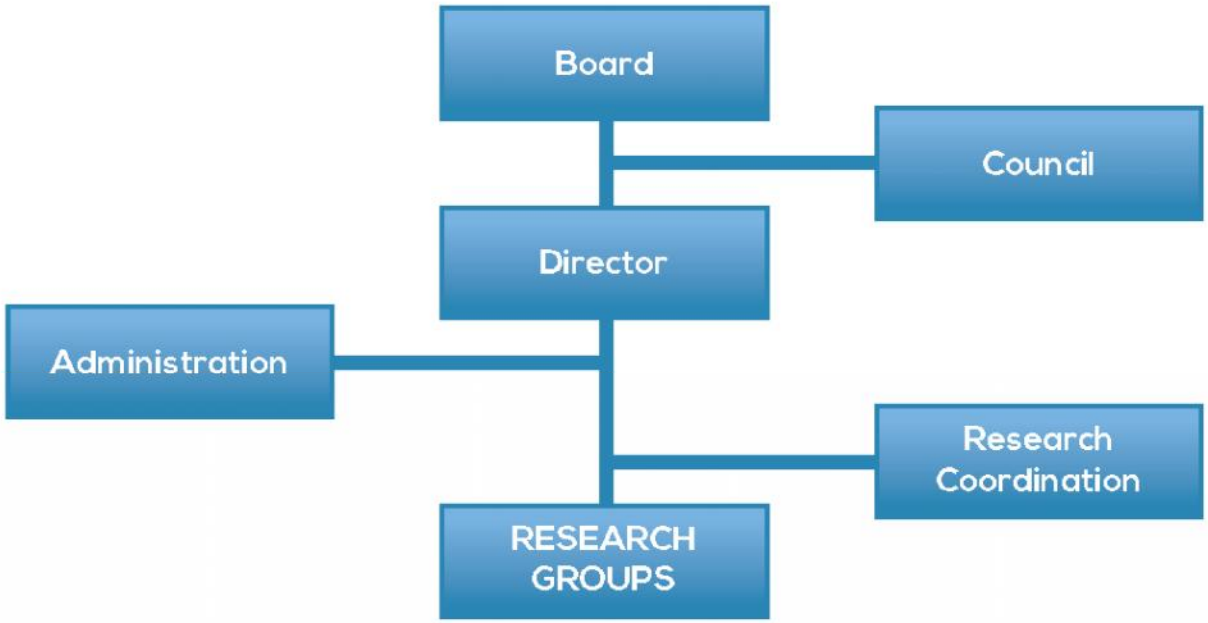
Services

for stakeholders and the general public rely on careful development and testing towards operational use, including:

- Marine and sea ice services
- Harmful algal bloom monitoring
- Climate services
- Air quality and extreme winds

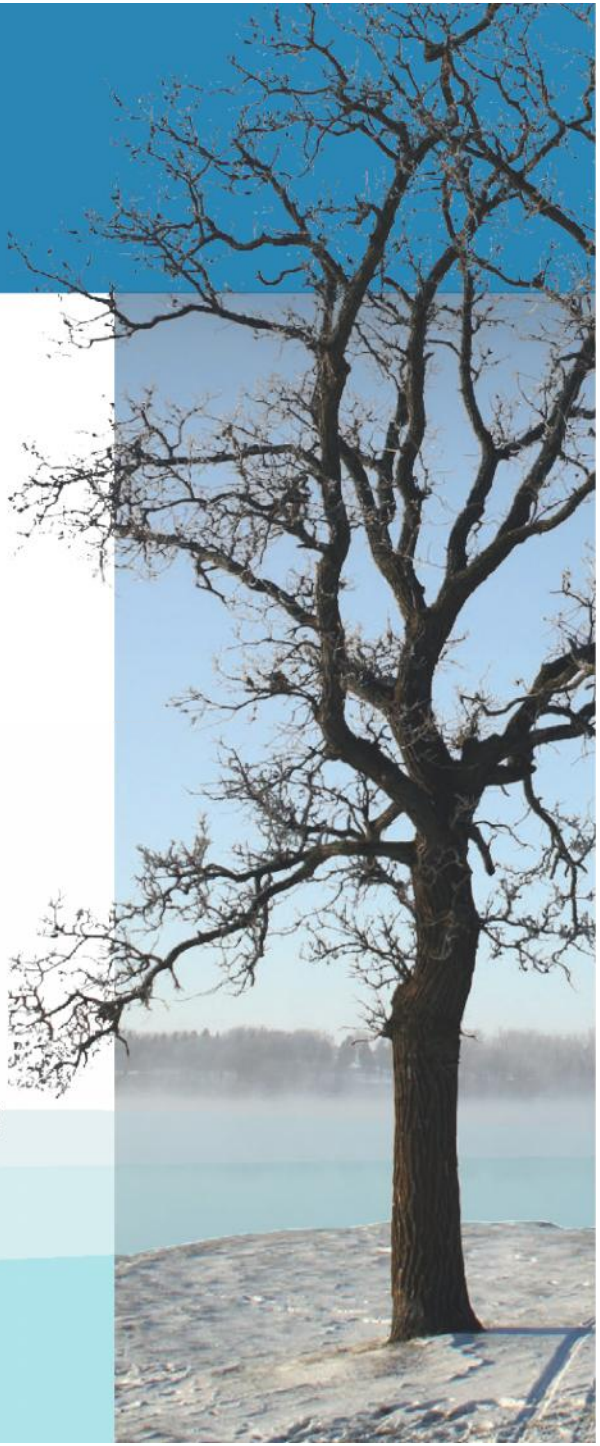
NERSC

ORGANISATION



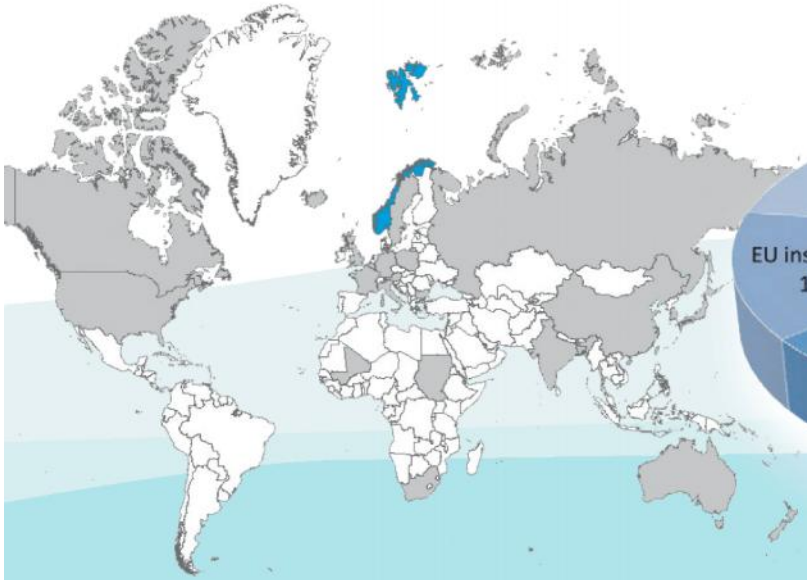
Climate processes
Climate modelling & prediction
Sea ice modelling
Ocean modelling
Data assimilation

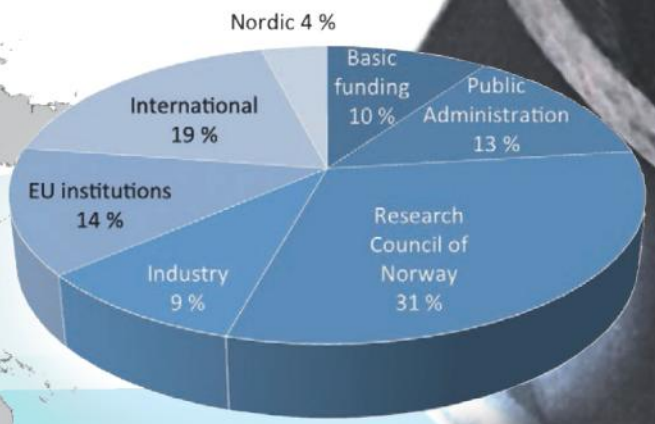
Ocean & coastal remote sensing
Sea ice & land ice remote sensing
Acoustics & oceanography
Scientific data management

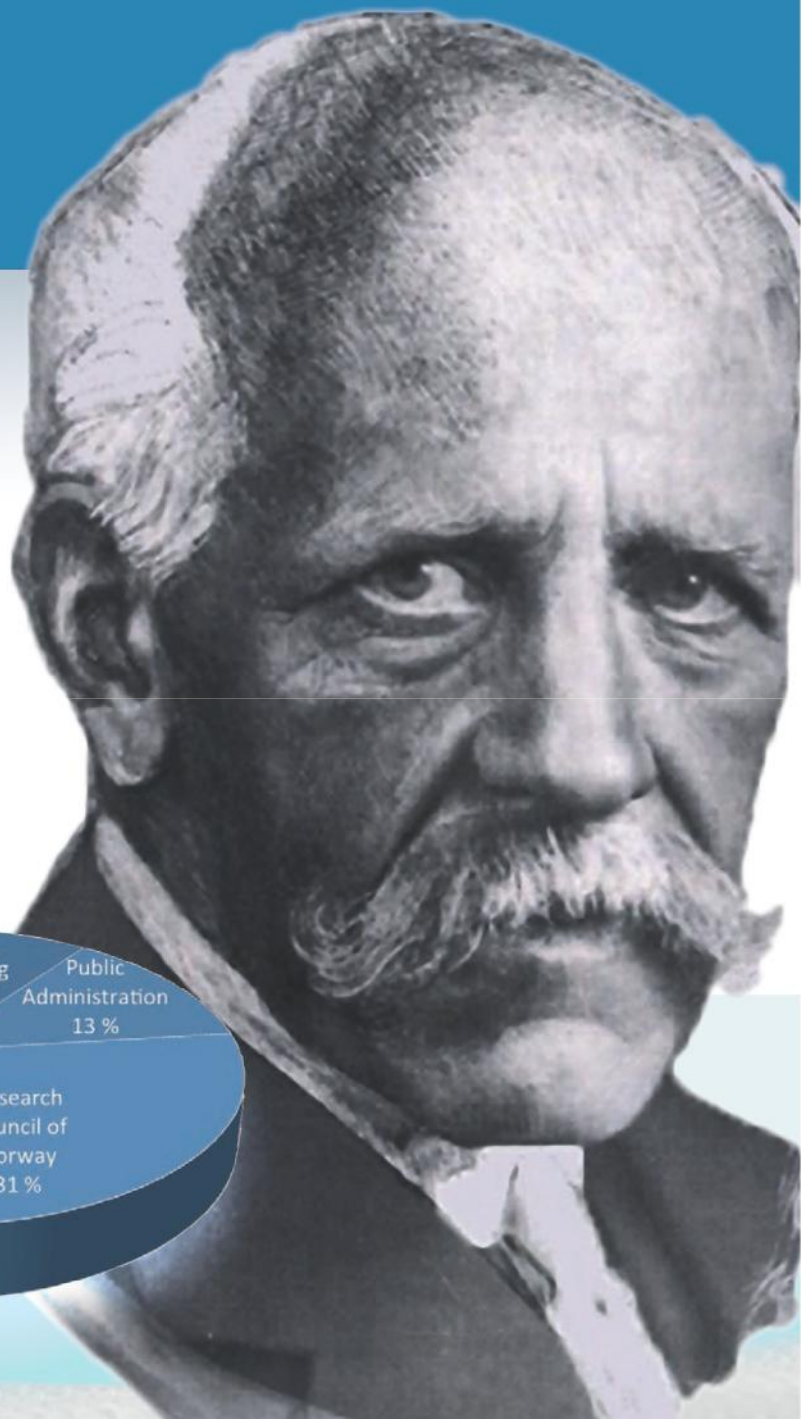


KEY FIGURES (2015)

Employees	77
Nationalities	24
Scientists with PhD	74 %
Research projects	112
Research groups	9
Turnover	65 mill NOK





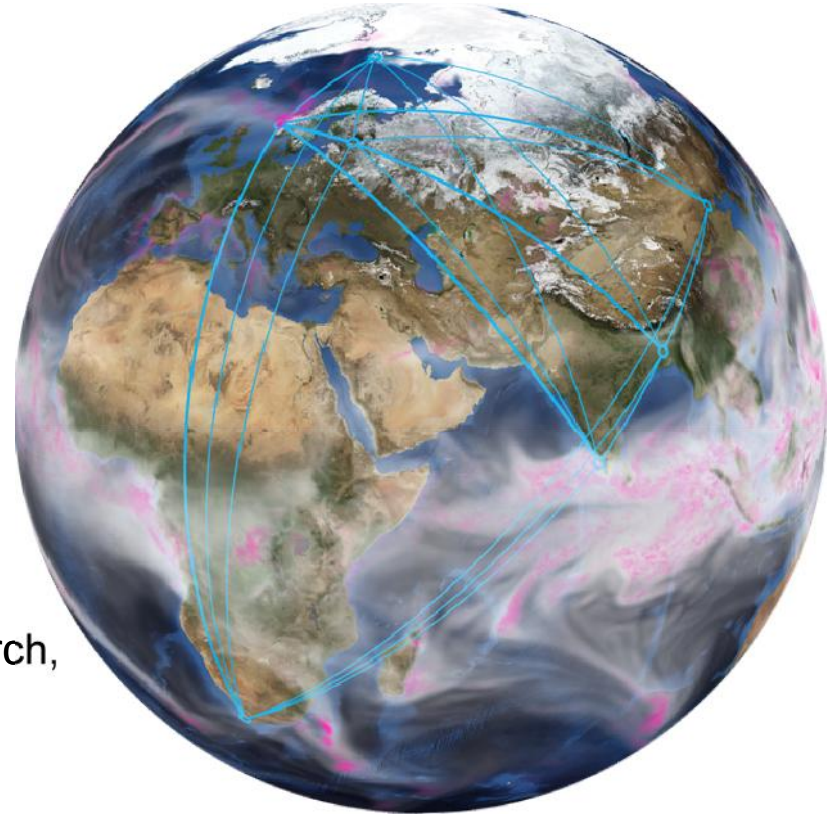


Nansen Group of Research Centers

Founder: Prof. Ola M. Johannessen

Nansen Scientific Society

- Nansen Environmental and Remote Sensing Center, Bergen, 1986
  - NERSC office @ UNIS, Longyearbyen, Svalbard 2006
- Nansen International Environmental and Remote Sensing Centre, St. Petersburg, Russia 1992
- Nansen Environmental Research Centre – India, Cochin, India 1999
- Nansen-Zhu International Research Centre, Beijing, China 2003
- Nansen Tutu Centre for Marine Environmental Research, Cape Town, South Africa 2010
- Nansen International Centre for Coastal Ocean and Climate Studies, Dhaka, Bangladesh, 2012
- Terra Orbit AS Bergen, 1987
- Nansen Scientific Society, Bergen, 2007



NERSC NERCI NZC NANSEN-TUTU CENTRE MARINE ENVIRONMENTAL RESEARCH NABIC

More than 210 employees, including 65 PhDs

NERSC


NERSC

Nansen Scientific Society

a idealistic foundation for *"Knowledge without Borders"*

Nansen Scientific Society

THE VISION of the Nansen Scientific Society is that education and research within global environment and climate problems, including their impacts on society for students and young scientists from different countries and cultures will provide a foundation for greater understanding and co-existence in the world - in Fridtjof Nansen's spirit.

President; Prof. Ola M. Johannessen

NERSC


NERSC

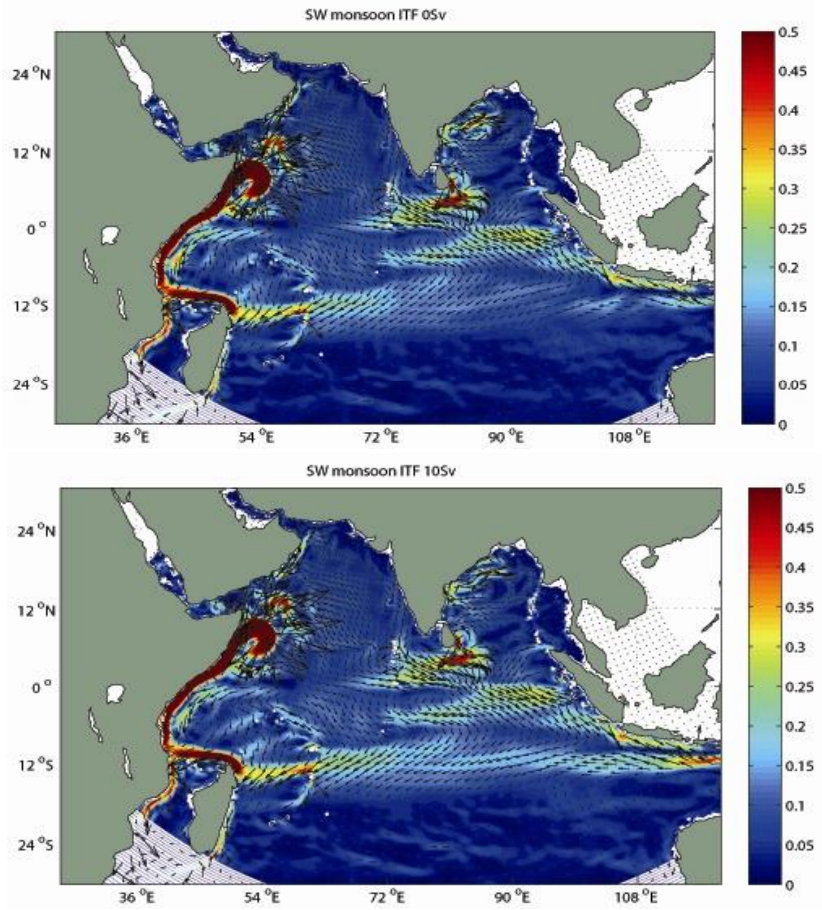
Nansen Environmental Research Centre (India)

Cochin, Kerala. Director Dr. K. Ajith Joseph

- a non profit Environment and Climate Research Centre (SIRO) established in 1998*

Vision

Make a significant contribution to environmental and earth sciences research and applications in India through local capacity building as well as increased national and international cooperation.



Main research areas:

- Monsoon and ocean variability, Climate Change, Sea level variations
- Marine Ecosystem studies with focus on forcing mechanisms and algal blooms
- Coastal Zone Management and Societal issues

** Scientific and Industrial Research Organization (SIRO) accreditation with DSIR (since 2012).*

Cooperation in India

- **Indian National Centre for Ocean Information Services (INCOIS)**, Hyderabad, Andhra Pradesh
- **Cochin University of Science and Technology (CUSAT)**, Cochin, Kerala
- **Anna University**, Chennai, Tamil Nadu
- **Tata Environmental Research Institute (TERI)**, Delhi
- **Kerala University of Fisheries and Ocean Studies (KUFOS)**, Cochin, Kerala
- **Indian Institute for Tropical Meteorology (IITM)**, Pune, Maharashtra
- **National Centre for Antarctic and Ocean Research,** Vasco da Gama, Goa
- ….

EC FP7: INDO-EUROPEAN Research Facilities for Studies on Marine Ecosystem and Climate in India
(INDO-MARECLIM) 2012-2015

Overall Objective

To use and extend the Nansen Environmental Research Centre - India (NERCI) as a joint research facility for scientific co-operation between India and the European Union member states and associated countries in the areas of:

a) monsoon climate variability,
b) marine ecosystems studies and
c) costal management, including impact on society.

THE HINDU

6th March, 2012

Research project on climate change planned

Staff Reporter

The project aims to analyse changes in the monsoon patterns, sea-level rise and coastal erosion.

KOCHI: A few research institutions in the European Union are joining hands with their Indian counterparts for studies on marine ecosystems and climate change in India.

The Kochi unit of the Nansen Environmental Research Centre-India (NERCI) and its associates including Indian National Centre for Ocean Information Services, Anna University, Cochin University of Science and Technology, Kerala University of Fisheries and Ocean Studies and Toc H Institute of Science and Technology will kick off the research projects shortly.

The NECRI will provide Indian scientists the platform for interaction with institutions in U.K., France, Italy, the Netherlands and Norway. The project aims to analyse some of the challenges of the Indian Ocean including changes in the monsoon patterns, sea-level rise, coastal erosion, changes in primary production, fisheries and biodiversity processes. It will also look into marine ecosystem studies, including algae blooms and coastal zone management and impact on society.

The projects are also expected to contribute to building strategic research and development partnerships between institutions in Europe and India, said Ola M. Johannessen, founding director of the Nansen Environmental and Remote Sensing Centre, Norway.

The three-year project will also lead to the advancement of the scientific understanding and the capability for prediction of processes related to the monsoon, marine living resources and its resultant socio-economic impact on the Indian society, Prof. Johannessen said.

N.R. Menon, an Emeritus Professor at School of Marine Sciences, Cochin University of Science and Technology, will be the coordinator of the project and along with Dr. Lasse Pettersson.

P.V. Joseph, former director of the Indian Meteorological Department, will lead the research component connected with monsoon, climate change, sea level variations.

FP7: Indo-MareCLIM Outcome

- Develop Indo-European research facilities for studies on marine ecosystem and climate in India
- **Strengthen the partnership and building network of cooperation**
- Organizing and hosting summer schools for PhD students and Post-docs
- **Development of joint competitive Indo-European research project proposals**

=> EU Horizon 2020, National and International programs, World Bank,….

- Expand the INDO-MARECLIM institutional arrangements to additional European partners
- **Summary publication of this workshop (EOS)**
- **White Paper on CZM and impact on Society**

www.indomareclim-nerci.in

INDNOR/NORKLIMA call "*Climate change – research collaboration with India*"
INDIA-CLIM (2012.01-2015.06)

The Research Council of Norway

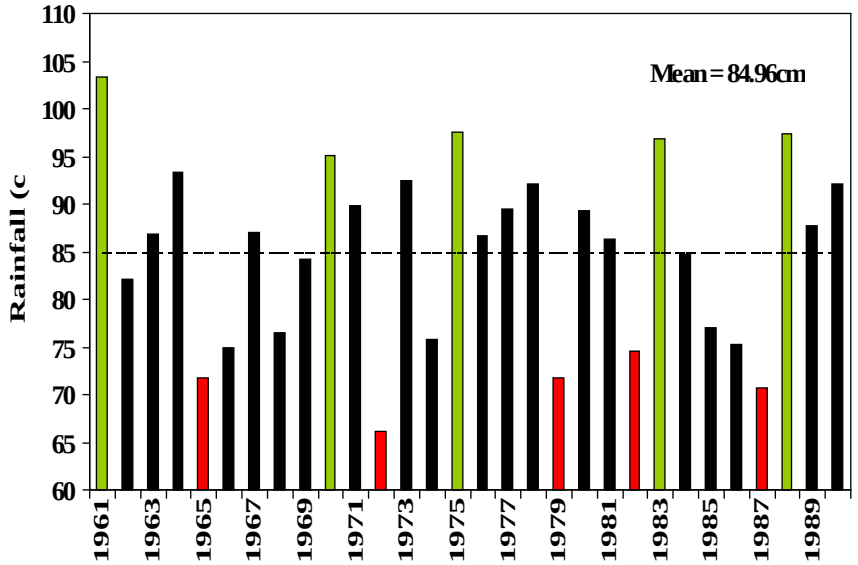
INDIACLIM: Decadal to multi-decadal variability in the Indian Monsoon Rainfall and teleconnection with Atlantic Multidecadal Oscillation (AMO)

- a joint study of observed and modelled variations in climate in India

Joint publications: 12
PhD dissertations: 1+1

Overall Objective:

To explore decadal to multi-decadal variations in Indian Monsoon (IM) in the last 600 years and to identify the remote causes from Atlantic Multi-decadal Oscillation (AMO) on variations in temperature and precipitation patterns affecting water availability in India in order to contribute to better prediction of Indian Monsoon Rainfall (IMR).



NERCI

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INDIACLIM Publications

1. Abish, B., P. V. Joseph, and O. M. Johannessen, (2015): Climate change in the subtropical jetstream during 1950–2009. Adv. Atmos. Sci., 32(1), 140–148, doi: 10.1007/s00376-014-4156-6.
2. Abish, B., P.V. Joseph and O.M. Johannessen, (2013): Weakening Trend of the Tropical Easterly Jetstream of the Boreal Summer Monsoon season 1950 - 2009, Journal of Climate. http://dx.doi.org/10.1175/JCLI-D-13-00440.1
3. Cui, X.D., Gao, Y.Q., Sun, J.Q. (2014): The response of the East Asian summer monsoon to strong tropical volcanic eruptions. Adv. Atmos. Sci., 31(6), 1245-1255, doi: 10.1007/s00376-014-3239-8
4. Cui, X.D., Gao, Y.Q., Sun, J.Q., Guo, D., Li, S.L., Johannessen, O.M. (2014): Role of external forcing factors in modulating the Indian summer monsoon rainfall, the North Atlantic Oscillation and their relationship on inter-decadal timescale Climate Dynamics, 43, 2283-2295, DOI: 10.1007/s00382-014-2053-4
5. Gong, D.Y., Gao, Y.Q., Guo, D., Mao, R., Yang, J., Hu, M., Gao, M.N., (2013): Interannual linkage between Arctic/North Atlantic Oscillation and tropical Indian Ocean precipitation during boreal winter. Climate Dynamics, 42, 1007-1027, DOI 10.1007/s00382-013-1681-4
6. Joseph, P.V., G. Bindu and N. Preethi, (in press, 2016): Impact of the upper tropospheric cooling trend over the central Asian on the Indian summer monsoon rainfall and the Bay of Bengal cyclone tracks. Current Science. J. of the Indian Academy of Sciences.
7. Joseph, P.V., G. Bindu, A. Nair, S. Wilson, 2013: Variability of summer monsoon rainfall in India on in- ter-annual and decadal time scales, Atmos. Oceanic Sci. Lett., 6, 398–403, doi:10.3878/j.issn.1674-2834.13.0044.
8. Svendsen, L., S. Hetzinger, N. Keenlyside, and Y. Gao (2014): Marine-based multiproxy reconstruction of Atlantic multidecadal variability, Geophysical Research Letters, 41, doi:10.1002/2013GL059076.
9. Svendsen, Lea, Nils Gunnar Kvamstø, and Noel Keenlyside (2013): Weakening AMOC connects Equatorial Atlantic and Pacific interannual variability, Climate Dynamics, doi:10.1007/s00382-013-1904-8

Publications to be published

10. Luo, Feifei, Yongqi Gao, Lea Svendsen, Noel Keenlyside, Shuanglin L. and Tore Furevik (in prep. 2016): External forcing synchronizes the Atlantic Multidecadal Variability and the Indian Summer Monsoon. To be submitted to Geophys. Research Letters.
11. Sankar, Syam, Lea Svendsen, Bindu G., and P. V. Joseph, and Ola M. Johannessen (in prep.): Teleconnections of Indian Summer Monsoon Rainfall with Atlantic Multidecadal Variability from 1400 to present. Under review Tellus.
12. Wilson, Shinu Sheela, Joseph P.V, K. Mohanakumar, and Ola M. Johannessen, 2016: Temporal and Spatial Variability of the Low Level Jetstream of Asian Summer Monsoon. Under review Climate Dynamics.

Nansen Group - Capacity building "Summer" Research Schools

- Nansen-NVP-2015, Svalbard:
  Interdisciplinary PhD and Post-Doc summer school 2015: Arctic Ocean Governance as a Multifunctional Challenge
  - Participation: 30 students and 15 lecturers
- NTC-NERSC-2014, South Africa:
  Ocean, Climate and Marine Ecosystem: a focus on the Agulhas Current, the Benguela upwelling system and the Tropical Atlantic
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  Climate change, marine ecosystem and coastal zone management
  - Participation: 30 students and 24 lecturers

Operational Oceanography: Indian Ocean circulation and sea level variation

Topics:

- Monsoon variability at intra-seasonal and inter-annual time scale and its impact on Indian Ocean Circulation
- Operational Indian Ocean Circulation and Modelling
- Remote sensing data
- Data Assimilation for ocean forecasting
- The Nansen-TOPAZ ocean modellingsystem
- Physics of sea level variations and Indian Ocean sea level variation.

Faculty Members (17):

- Dr. A. Carrassi, NERSC, Bergen
- Dr. Jan Even Nilsen, NERSC, Bergen
- Prof. O.M. Johannessen, Nansen Scientific Society, Bergen
- Dr. Anton Korosov, NERSC
- Mr. Lasse H. Pettersson, NERSC
- Dr. Yu Wei Dong, Center for Ocean and Climate Research (FIO), Qingdao, PR. China
- Prof. P.V. Joseph, NERCI, India
- Dr. A.K. Joseph, NERCI, India
- Dr. S.S.C. Shenoi, INCOIS, India
- Dr. Arya Paul, INCOIS, India
- Dr. T.M. Balakrishnan Nair, INCOIS, India
- Dr. P. A. Francis, INCOIS, India
- Dr. Pattabhi Ramarao, INCOIS, India
- Dr. R. Harikumar, INCOIS, India
- Dr. Amit Apte, Centre for Theoretical Sciences, Bangalore, India
- Dr. Unnikrishnan, NIO, Goa
- Dr. S Kumar, INCOIS, India

Research school activities

- Frame setting presentations and lectures
- Student poster presentations
- Group work and interactive sessions:
  - Student experiences
  - Formulations of questions
  - Discussions and “answers” to questions
  - Collect notes and write synthesis
  - External resources and information – additional sources
  - Report/Paper preparation and presentation
- Plenary discussions

Five thematic student working groups:

1. Ocean Modelling
2. Data Assimilation
3. Sea Level Variation
4. Real Time Ocean Observations
5. Forecasting, Applications and Market

Participants, Venue and Sponsors

- Lecturers: 17
- Student applicants: 67
- Student participants: 31
  - India, Cameroon, Norway, France, Portugal, Sri Lanka, Bangladesh, South Africa, China and Russia
- E-classroom @ ITCOocean
- Sponsored by:
  - Ministry of Earth Sciences
  - Research Council of Norway
  - Nansen Scientific Society
  - INCOIS & ITCOocean
  - Nansen Center

16. to 21. October 2016 in Hyderabad