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Pictures of cyclone Phethai and Kenanga during 15-17 December 2018

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The Indian meteorological Society was established in 1956 and was registered on 26 May 1972 under the societies Registration act of 1860 as amended by Punjab Amendment Act 1957 applicable to Delhi. Registration No. of the society is 5403. The society's headquarter is located at Delhi and its local chapters are functional at various places.

The Society is a non-profit making organization and none of its income or assets accrues to the benefit of its members.

Objective of the Society

- 1. Advancement of Meteorological and allied sciences in all their aspects
- 2. Dissemination of the knowledge of such sciences both among the scientific workers and among the public and
- 3. Promotion of application of Meteorology and allied sciences to various constructive human activities

Any person who is interested in aims of the society is eligible to become a member.

The annual subscription of membership is Rs. 500/- for scientists from India. Admission fee is Rs. 50/-. "Bulletin of IMSP" is published monthly. Correspondence and contributions to the bulletin may be sent to <u>pune ims@rediffmail.com</u>. The manuscript should be typed at 1.5 space using Times New Roman font size 12. The author's name should be typed on the line below the title, the affiliation and email ID should follow on next line.

Chief Editor Dr. Jeevanprakash Kulkarni

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Activities of ICMPO and its recent initiative to collaborate with IMS

SomnathMahapatra IITM, Pune

International CLIVAR Monsoons Project Office (ICMPO) is an important node of International CLIVAR Project Office (ICPO). Ministry of Earth Sciences, Government of India has established this office (ICMPO) at the Indian Institute of Tropical Meteorology (IITM), Pune as a subset of the ICPO, Qingdao, China. The establishment of ICMPO at IITM was initiated under an agreement betweenWorld Climate Research Programme (WCRP) and IITM, and has been approved by the Union Cabinet on 12th August 2015. WCRP facilitates analysis and prediction of Earth system variability and change for use in an increasing range of practical applications of direct relevance, benefit and value to society. CLIVAR (Climate and Ocean: Variability, Predictability and Change) is one of the core projects of the WCRPto study climate variability and predictability with a focus on the role of the coupled ocean and atmosphere within the climate system. CLIVAR's mission is to understand the dynamics and the predictability of the coupled ocean-atmosphere system, with a goal to improve the understanding and prediction of ocean-atmosphere interactions and their influence on climate variability and change on seasonal, inter-annual, decadal, and centennial time-scales, through the collection and analysis of observations and the development and application of models of the coupled climate system, in cooperation with other relevant climate-research and observing activities. The Global Energy and Water cycle Exchanges (GEWEX) is another core project of WCRP, dedicated to understand Earth's water cycle and energy fluxes at the surface and in the atmosphere. The responsibilities of the ICMPO include support to CLIVAR/GEWEX Monsoon Panel (MP), CLIVAR/IOC-GOOS Indian Ocean Region Panel (IORP) and to co-ordinate and arrange teleconference meetings for the Working Groups of the Asian-Australian Monsoon, the African Monsoon and the American Monsoon. The ICMPO is also responsible for providing support to CLIVAR research focus on intra-seasonal, seasonal and inter-annual variability and predictability of monsoon systems, in close cooperation with the WCRP grand challenges on regional climate information and other activities. In addition to these, the activities of ICMPO include publication of scientific newsletter "CLIVAR Exchanges" and development of Monsoon Web Portal, which catalogues current monsoon research initiatives, information and resources relevant for the international monsoon community and dissipating the highlights of the CLIVAR activities to Indian Scientific Community.

At present, Dr. M. M. Ali is the Executive Director of ICMPO. He joined ICMPO on 15th September 2017, after the term of Dr. R. R. Rao, the former Executive Director (the termended on 31st May 2017). Dr. R. Krishnan acted as an interim Executive Director, ICMPO. Dr.Ashwini Kulkarni, Scientist-E and **S.** Mahapatra, Scientist-Eare working as Senior Scientists at ICMPO on part time basis (as additional responsibility). Earlier, Dr. K. P. Sooraj and Dr. R. H. Kripalani worked as Senior Scientists at ICMPO.Mr. Harish Borse, Assistant Engineer (IT), looks after the technical aspects of ICMPO, especially website designing, preparing layout of CLIVAR Exchanges and organizing teleconferences, etc.

During last 3 years, ICMPO hasbeen supporting CLIVAR-GEWEX Monsoons Panel (MP), an important activity of WCRP and have shared certain other responsibilities (of WCRP) with ICPO,Qingdao, China. ICMPO has also supported Indian Ocean Region Panel (IORP) to some extent. In this context, Dr. R. R. Rao, Former Executive Director, ICMPO attended the 13thAnnual Meeting of the IOGOOS on 2nd February 2017 at Perth, Australia.Discussions and presentationsamong International scientists of Monsoons Panel and with ICPO, China have been generally conducted through teleconferences.ICMPO contributed for publication and printing of CLIVAR Exchanges, after necessary editorial checking. It has contributed for organization of high level meetings at different parts of the world. ICMPO organised the 23rdSession of the CLIVAR SSG (Scientific Steering Group) Meeting, at International CLIVAR Monsoon Project Office, IITM, Pune (India), during 27-30 November 2017, in which 23 SSG / Panel members participated.One of the important agenda of the meeting was to prepare the draft of "CLIVAR Science Plan". Dr. Ali, Dr.Ashwini Kulkarni, Mr. S. Mahapatra and Mr. Harish Borse significantly contributed for organization of this meeting.



[Group photograph of participants & organizers of 23rd Session of CLIVAR SSG meeting]

During this meeting, a public lecture on "Modelling the Indian monsoon and the INCOMPASS field campaign" was delivered by Dr. Andrew Turner (Reading University, UK) on 27th November 2017

and a half day science workshop was arranged on 29th November 2017 in which three SSG / Panel members and 6 Scientists from reputed Indian institutions delivered talks.

In addition, ICMPO helped in organization of the GEWEX-CLIVAR Monsoons Panel Meeting at the National University of Singapore on 18th November 2017. Dr. M. M. Ali, Executive Director, ICMPO attended this meeting in Singapore and gave a presentation on "Role of Ocean Heat Content in Monsoon Predictability". He also attended the 6thWMO International Workshop on Monsoons (IWM-VI) during 13-17 November 2017 in Singapore. Dr. M. M. Ali significantly contributed for organization of the 3rd GEWEX-CLIVAR Monsoon Panel Meeting, which was held on 6th& 8thMay 2018 in Canmore, Alberta, Canada. He also attended the 8th GEWEX Science Conference held in Canmore, Alberta, Canada during 6-11 May 2018.



[CLIVARSSG meeting, Washington D.C., USA and Monsoon Panel Meeting, Canmore, Canada]

Dr. M. M. Ali attended the 24thSession of the CLIVAR Scientific Steering Group (SSG) meeting, which was hosted by US CLIVAR during 27-29 November 29, 2018 in Washington D.C., USA.

As a new initiative, ICMPO has started some outreach programs. In order to keep the Indian Scientists abreast of the activities going on in CLIVAR, email alert of bulletins have been initiated. Dr. M. M. Ali delivered the WMO lecture at Department of Space & Atmospheric Sciences, Savitribai Phule Pune University on 23rd March, 2018. Mr. S. Mahapatra interacted with several visitor groups and delivered several lectures. ICMPO wants to enhance outreach programs and activities through collaborations. In this regard, ICMPO has shown interest to collaborate with Indian Meteorological Society (IMS), especially with its Pune Chapter (IMSP). Several eminent Scientists feel that ICMPO and IMSP togethercan formulate and organize several outreach programs for popularization of climate sciences and environmental issues (including climate change issues).For a greater visibility of ICMPO amongst Indian Scientists, these collaborations may be useful. In this context, S. Mahapatra delivered a lecture entitled "International Organizations for Climate Variability and ICMPO at IITM, Pune" on 1st

September 2018, to the participants of "Teachers' Training Workshop on Meteorology", organized by IMS Pune Chapter at IITM during 30^{th} August – 1^{st} September 2018. More activities can be planned through mutual interactions. It is felt that IMS-ICMPO can develop several new initiatives for science popularization and public outreach. For necessary details about ICMPO, following web-link can be visited:

https://icmpooffice.000webhostapp.com/

Important weather event of the month: Cyclone Phethai over Bay of Bengal

Kulkarni J. R. Vainatey, Rajyog Society, Baner, Pune 411045

1) Introduction

A cyclonic storm "Phethai" occurred over Bay of Bengal (BoB) during the period 16-17 December 2018. It moved westnorthweast wards towards Andhra coast. Most of the regions in Maharashtra are under drought conditions. The formation of cyclone raised hopes for rainfall over Maharashtra area. But due to prevalence of anticyclonic vorticity associated with the subsidence of large scale air, rainfall did not occur over Maharashtra during cyclone period.

2) Cyclone Phethai

On Saturday 15 December, a deep depression over southeast Bay of Bengal (BoB) moved northwestwards with a speed of 10 Kmph and remained centered at 1130 hrs IST over southwest & adjoining southeast BoB near 9.4°N and 85.1°E, about 430 km eastnortheast of Trincomalee (Sri Lanka), 670 km east-southeast of Chennai (Tamilnadu) and 870 km south-southeast of Machlipatnam (Andhra Pradesh). It was forecasted by IMD to intensify it further into a Cyclonic Storm in the next 24 hours and into a Severe Cyclonic Storm. It was forecasted to move north-northwestwards and cross Andhra Pradesh coast between Ongole and Kakinada on 17th December afternoon.

The deep depression intensified in to cyclonic Storm over southwest BoB on 16th December. It was christened as "PHETHAI". It was located over southwest BoB near 11.3°N and 84.4°E, about 460 km east-northeast of Trincomalee (Sri Lanka), 490 km east-southeast of Chennai (Tamilnadu), 640 km south-southeast of Machlipatnam (Andhra Pradesh) and 670 km south-southeast of Kakinada (Andhra Pradesh). It was forecasted to move north-northwestwards and cross Andhra Pradesh coast between Machlipatnam and Kakinada on 17th December afternoon.

Figure 1 shows visible satellite picture of the cyclone Phethai on 17 Dec. 2018, 12.00 IST. It weakened on 0530 hrs IST of 17th December, 2018 and was located over westcentral BoB near 15.2°N and 82.2°E, 320 km east-northeast of Chennai (Tamilnadu), 160 km southeast of Machlipatnam (Andhra Pradesh) and 190 km south of Kakinada (Andhra Pradesh). Under its influence, heavy to very heavy rainfalls occurred at a few places over Coastal Andhra Pradesh; over Odisha; south Chhattisgarh, Jharkhand, Gangetic West Bengal and Andaman & Nicobar Island on 17th.

Interestingly, there was another cyclone south of the equator over Indian Ocean during the same period. The cyclone in the SH was named as "Kenanga". Figure 2 shows the locations of the two cyclones on 17 December 2018.



Figure 1 Visible satellite image of cyclone Phathai on 16 December 2018.



Figure 2 Locations of the two cyclones on either side of the equator on 16 December 20108.

3) No rainfall over Maharashtra during the cyclone period

Most parts of Maharashtra are under severe drought conditions. There was hoped that widespread rainfall would occur under the influence of cyclone which would give some relief to the drought affected areas of Maharashtra. Following figure shows vorticity distribution at 850 hPa level over India, associated with the cyclone Phathai on 17 December 2018.



Figure 3 Vorticity distribution at 850 hPa level over India on 17 December 2018.

It is seen that cyclonic vorticity prevailed over the southwest BoB in the cyclonic area. The anticyclonic vorticity prevailed over most parts of Maharashtra. This anticyclonic vorticity is associated with the subsiding motion. The large scale rising of air occurred over cyclonic area and descending motion occurred over Indian land mass. This prohibited formation of convection, and rainfall over the Maharashtra.

4) Summary

Two cyclones, on either side of the equator occurred over BoB and Indian ocean during the period 17-18 December 2018. The cyclone over BoB was named :Phethai" and over south of the equator was named "Kenanga". Phethai cyclone moved westnothwest wards towards Andhra Pradesh. It produced heavy to very heavy rainfalls over coastal Andhra Pradesh, Odisha; south Chhattisgarh, Jharkhand, Gangetic West Bengal and Andaman & Nicobar Island. However, the rainfall was absent over drought stricken Maharashtra.

Acknowledgments.

All the material in this paper is taken from IMD website imd.gov.in. Author acknowledges the same.

Research Highlights Anomalous warming of the Indian Ocean during the 20th century

Abhay SD Rajput, IITM, Pune

(Source: Roxy M.K., Kapoor R., Terray P., Masson S., Curious Case of Indian Ocean Warming, Journal of Climate, 27, November 2014, DOI:10.1175/JCLI-D-14-00471.1, 8501-8509)

A warming trend in the Indian Ocean is beings investigated. In comparison to other oceans, the Indian Ocean is relatively warming faster than usual. Recent studies have found that the entire Indian Ocean is getting warmer throughout the past half-century. But there is uncertainty over the possible reasons behind this warming. Some of these studies have suggested that there may be a connection between individual El Niño and the warm Indian Ocean events. However, no such relationship has been demonstrated with respect to the long-term warming trends. It is important to mention here that the Indian Ocean plays an important role in the Indian Monsoon. So any change in the Indian Ocean sea surface temperature will translate into change in the Indian Monsoon. Therefore, taking a clue from here, a study was conducted by Dr. M.K. Roxy *et al.* at the Indian Institute of Tropical Meteorology (IITM), Pune to explore the possible association of the Indian Ocean warming with El Niño during summer.

To study the long-term warming trend in the Indian Ocean and its correlations, the Hadley Centre Sea Ice and Sea Surface Temperature (SST) dataset for the period 1901-2012 obtained from the Met Office Hadley Centre was used. To further assess the robustness of results, extended reconstructed sea surface temperature (ERSST) and Hadley Centre night time Marine Air Temperature datasets were also used. To ascertain the role of greenhouse warming with regard to the Indian Ocean, SSTs from a suite of 25 climate models participating in phase 5 of the Coupled Model Intercomparison Project (CMIP5) were also used.

A global coupled ocean-atmosphere model called 'SINTEX-F2 model' was utilized for the numerical model experiments. The model has a realistic simulation of the ENSO-monsoon variability, and its coupled configuration was time integrated over a period of 300 years and was utilized as the reference run. Further, by suppressing the SST variability over the Pacific, a model sensitivity run was performed over a period of 110 years to assess the role of El Niño Southern Oscillation (ENSO) on the Indian Ocean.

The study reveals that the western Indian Ocean has been continuously warming since the start of the 20th century, and the rate of warming gets increased in the second half of the century i.e., after 1950s. While in the rest of the Indian Ocean (including the warm pool), the warming is prominent only after the 1950s. It is found that the mean summer SST over the western Indian Ocean at the beginning of the twentieth century was around 26.5°C, while that of the rest of the Indian Ocean was 27.2°C. This shows that the western Indian Ocean was cooler than the rest of the Indian Ocean at the beginning of the 20th century. The subsequent and continuous warming over the century raised the western Indian Ocean SSTs values as high as 28.0°C. During 1901-2012, the western Indian Ocean showed an anomalous warming of up to 1.2°C, while the warm pool showed warming up to 0.7°C only. This difference in warming by 0.5°C is significant with respect to the Indian Ocean SSTs, and in turn, it can play a significant role in the monsoon dynamics. This sustained warming over the western Indian Ocean (from 26.5° C to 28.0°C) against that of the warm pool can have significant impact on the zonal SST gradient and the monsoon circulation, and can drastically change the convective response from shallow to deep convection.

The study indicates that ENSO dominates the western tropical Indian Ocean variability during boreal summer through fast atmospheric teleconnections. It is observed that the number and intensity of El Niño events have significantly increased during the second half of the 20th century, which coincides with the increasing rate of Indian Ocean warming during the last five decades. On the other hand, La Niña shows relatively smaller SST anomalies in the Indian Ocean in comparison to El Niño. As compared to other oceans, the Indian Ocean is surrounded by the landmass, which restricts the ocean circulation. Hence, the warming in the Indian Ocean remains for a relatively longer period.

This long-term and continuously persistent warming of the Indian Ocean will have significant impact on climate dynamics, especially on that of the Indian Monsoon. The study advocates that this abnormal warming of the Indian Ocean should be taken seriously while assessing long-term climate change and variability.

(Source: Roxy M.K., Kapoor R., Terray P., Masson S., Curious Case of Indian Ocean Warming, Journal of Climate, 27, November 2014, DOI:10.1175/JCLI-D-14-00471.1, 8501-8509)



Fig.: (a) The western Indian Ocean (WIO) is generally cool, while the rest of the Indian Ocean is a warm pool region with sea surface temperature (SST) greater than 28.0°C (shades of red) during summer. (b) During the past century, the WIO has warmed up tremendously, reaching up to the SST values of the warm pool and weakening the zonal SST gradient. This warming turns out to be the major contributor to the global ocean surface warming.

5) **IMSP News**

IMSP members received awards for their contributions to the atmospheric science. IMSP congratulates them and wish them to achieve such awards in future. Following is the lat of awards.

- Prof. Ravi Nanjundiah, Director IITM has been honoured with IMS Fellowship, in the TROPMET held at Varanashi in October 2018.
- The Indian Institute of Tropical Meteorology (IITM), Pune celebrated its 57th Foundation Day on 17 November 2018. On this occasion, following IMSP members received awards:.
- IITM Golden Jubilee Award 2017 to Dr. G. Pandithurai and Dr. Thara Prabhakaran.
- **IITM Annual Silver Jubilee Award** for the best research paper published in peer reviewed journal for the year 2017 to the paper "Recent trends and tele-connections among South and East Asian summer monsoons in a warming environment" by **Preethi B., Mujumdar M., Kripalani R.H., Prabhu A. and Krishnan R**. published in Climate Dynamics, Vol. 48, April 2017, DOI:10.1007/s00382-016-3218-0, 2489-2505.
- Dr. Ananthakrishnan Award for the Best Ph.D. thesis for the year 2017 to Dr. Sachin Patade for his thesis "New Parameterization for Ice Nucleation in Indian Monsoon Clouds based on CAIPEEX Observation" under the guidance of Dr. Thara Prabhakaran (IITM) and Dr. Kumar P.P. (Savitribai Phule Pune University).
- The Best Student Research Paper Award for 2017 to Dr.(Smt.) Gayatri Kulkarni. for the paper "Aerosol-Cloud interaction in deep convective clouds over the Indian Peninsula using spectral (bin) microphysics" published in Journal of Atmospheric Sciences, 74, October 2017, 9, DOI:10.1175/JAS-D-17-0034.1, 3145-3166 by Gayatri K. et.al.
- Mr. Ustav Bhowmik for the paper "Statistical characteristics of convective clouds over the Western Ghats derived from weather radar observations" published in Journal of Geophysical Research, 122, September 2017, DOI:10.1002/2016JD026183, 1-27.
- IITM Excellent Performance Award for the year 2017 for the Scientific, Administrative, Support and Multi-Tasking Staff categories to Shri R.S.K. Singh, Smt. Bhavna Naik, Shri Raju Dhanak and Shri I.R. Mehetre respectively.

Brief details of scientific contributions by the award winners are given in following pages. IMSP requested to all the award winners to provide the material for this article. Whatever have been received are included in this issue. Others are requested to send the contributions to BIMSP news item which will be published in the next issue.

Prof. Ravi Shankar Nanjundiah



INDIAN METEOROLOGICAL SOCIETY FELLOWSHIP Prof RAVI SHANKAR NANJUNDIAH

Prof. Ravi Shankar Nanjundiah was born on 16th October, 1961. He obtained his BE (Mechanical Engineering) degree from Rani Durgavati University, Jabalpur in 1984 and ME (Mechanical Engineering) degree from the Indian Institute of Science (IISc), Bengaluru in 1986. He earned his PhD degree in Atmospheric Sciences from IISc, Bengaluru in 1992 on his thesis entitled 'Study of Intra-seasonal Variations of the Tropical Convergence Zones in a Simple Monsoon Model'.

After completing Post-Doctoral Fellow at the Mathematics and Computer Science Division of Argonne National Laboratory, USA, Prof. Ravi joined the Centre for Atmospheric and Oceanic Sciences (CAOS) at IISc, Bengaluru as an Assistant Professorin in July 1995. He became Associate Professor in July 2001; Professor in July 2007 and the Chairman of CAOS in December 2013. Subsequently, he took over the charge of Director of the premier research instituteIndian Institute of Tropical Meteorology (IITM), Pune on 2nd March 2017.

Study of Monsoon and its variability using climate models, application of High Performance Computing/Grid Computing for climate and weather-related studies, and use of Machine Learning Techniques for Monsoon prediction and downscaling studies are his key areas of interest. He has worked extensively on different aspects of the Indian Summer Monsoon. He was involved in a project sponsored by Intel Inc. titled "Intel Parallel Computing Centre for Modelling Monsoons and Tropical Climate (IPCC-MMTC)" for using computational accelerators such as Xeon-Phi for climate modelling. This research was conducted in collaboration with National Centre for Atmospheric Research (NCAR) of USA.

Prof. Nanjundiah has many awards and honours to his credit. A few to mention are: Nvidia Innovation Award 2013; Adjunct Faculty, ICTS-TIFR 2011-2014; Associate Editor, Journal of Earth System Sciences (published jointly by the Indian Academy of Sciences, Bangalore and Springer), 2008-2014; and Sir CV Raman Young Scientist Award for the year 2000 in the field of Earth Sciences. He is also a Member of the Editorial Advisory Board of Dynamics and Statistics of the Climate System (a new journal recently launched by Oxford University Press).

Prof. Ravi has been active in human resource development and so far he has guided 11 PhD, 04 M.Sc. (Engg.) and 09M.Tech. students. Currently, he is guiding 04 PhD students. He has 70+ peer-reviewed publications in national and international journals. He has also presented papers at several conferences.

In recognition of his outstanding contribution to teaching and research in Monsoon and its Variability using Climate Models and extensive work on different aspects of Indian Summer Monsoon prediction, the Indian Meteorological Society is privileged to confer upon Prof. RAVI SHANKAR NANJUNDIAH, the Fellowship of the Indian Meteorological Society on this day of 24th October, 2018.

Dr. R.H. Kripalani



Dr. R.H. Kripalani joined the Indian Institute of Tropical Meteorology (IITM) in the year 1970 and retired as a Senior Scientist in 2008. After retirement he was in South Korea for 2 years first as a Visiting Professor at the Pukyong National University and later as the Head of the Climate Research Department at the APEC (Asia-Pacific Economic Co-operation) Climate Centre (APCC), Busan, South Korea. During 2011-2017 he was back in IITM on contract basis first with the Centre of Advanced Training in Earth System Sciences and Climate and later with the International CLIVAR Monsoon Project Office. He has been a regular Visiting Professor with the Pukyong National University and Pusan National University, Busan South Korea since the year 2000. His research interests are Asian Monsoon Variability, tele-connections and Climate Model Diagnostics. He is a recipient of SAARC Award (1986) and IITM Silver Jubilee Awards during 1997 and 2017. Currently he is an invited faculty with the Training Centres in IITM as well as IMD, Pune.

Gayatri Kulkarni

1) IMS young scientist award (2017), 2) IITM's best student paper award for the year 2017



M.Sc. in Physics from Pune University in 2009. Started working as project fellow after completion of M.Sc. at Indian Institute of Tropical Meteorology (IITM) and in 2012 joined as a Research Fellow at IITM. Ph.D. under the guidance of Dr. Thara Prabhakaran from the University of Pune on the topic entitled "Aerosol effects on deep convective clouds within monsoon environment based on observations and numerical modeling". Working as a Project Scientist–C in CAIPEEX group at IITM, Pune.

Award paper highlights

The Weather Research and Forecasting (WRF) Model coupled with a spectral bin microphysics (SBM) scheme is used to investigate aerosol effects on cloud microphysics and precipitation over the Indian peninsular region. For the first time, the cloud droplet and particle spectra is compared with in situ aircraft observations from the Cloud Aerosol Interaction and Precipitation Enhancement Experiment (CAIPEEX). Results showed that clouds with high cloud condensation nuclei (CCN) concentrations have broader snow and graupel size distribution compared to clouds with low concentrations of CCN. The Hallett–Mossop ice multiplication process is illustrated to have a prominent impact on snow and graupel mass. Also, the enhancement of precipitation in the polluted environment associated with aerosol invigoration effect is explored in this paper.

Amita Prabhu

Amita Prabhu was born and brought up in Goa (India). She has been awarded Doctoral degree (2012) in the subject Atmospheric and Space Science from Savitribai Phule University of Pune, India. In the early stages of her career, she worked as a Research Fellow at National Centre for Antarctic and Ocean Research, Goa, in collaboration with Space Applications Centre, Ahmedabad, on Polar Sea ice studies for the detection of climate change signals. She joined Indian Institute of Tropical Meteorology in November 2005 as a Scientist with research interests in polar sea ice variability, seasonal prediction, Asian summerm monsoon teleconnections and climate change. Her Ph.D on "Variability of Polar Sea-Ice – Its possible linkage with Monsoon" produced several research papers in both national and international journals. Further, she pursued her postdoctoral fellowship at Pukyong National University, South Korea in the Integrated Climate System group in 2016. She is a recipient of J. Das Gupta Award on Atmospheric Observations and Technologies (2016) and IITM Silver Jubilee Award (2017)

Dr. Milind Mujumdar



Dr. Preethi B., Mujumdar M., Kripalani R.H, Prabhu A., Krishnan R were conferred the "Annual Silver Jubilee Award" for their best research paper published in peer reviewed journal for the year 2017, entitled "Recent trends and tele-connections among South and East Asian summer monsoons in a warming environment", Climate Dynamics, Vol.48, April 2017,