

ACHIEVEMENTS

संसदीय राजभाषा समिति बैठक (१८ जनवरी २०२३): दिनांक १८ जनवरी २०२३ को संसदीय राजभाषा समिति ने मुंबई में भारतीय उष्णदेशीय मौसम विज्ञान संस्थान, पुणे के साथ निरीक्षण बैठक की। इस दौरान समिति ने मंत्रालय एवं विभाग के वरिष्ठ अधिकारियों की उपस्थिति में हो रहे राजभाषा हिंदी के कार्यों का अवलोकन किया।

MoES Secretary's visit to Atmospheric Research Testbed (ART) Facility: Dr. M. Ravichandran, MoES Secretary, visited ART- Central India along with MoES officials & other delegates on 21st Jan 2023 and interacted with ART team stationed at Silkheda, Sehore (M.P.).

Establishment of 72-meter tall tower at IITM ART Silkheda Bhopal: The 72-meter tall tower has been installed at IITM Atmospheric Research Testbed (ART) site Silkheda, Bhopal, Madhya Pradesh. This unique facility has simultaneous observations of all major variables required for climate change research.

Ph.D. admissions through AcSIR at IITM: As recommended by the IITM GC in 2022, the Institute has signed an agreement (MoU) with the Academy of Scientific and Innovative Research (AcSIR) for Ph.D. program on 25 January 2023. Under this MoU, IITM has become an Associate Academic Centre of AcSIR and can admit Ph.D. students through AcSIR channel who would work for Ph.D. degree of AcSIR.

Program for Development of Skilled Manpower in Earth System Sciences (DESK) has conducted following Workshops:

- National Training Workshop on Paleoclimate -Archives, Proxies and Analysis/Measurement Techniques (NT-PALEO 2023) at IITM, Pune from 16-20 January 2023.
- National Training workshop on fundamentals of Data Assimilation (NTDA-2) was conducted by DESK during 6-10 February 2023 by arranging open lecture series on Advanced Level DA, AI &ML and
- Big Data Analysis by Prof. Laxmivarahan, University of Oklahoma, USA, which was attended by 40 participants. This is the second phase of NTDA.

National Atmospheric Chemistry Seminar Series (NACSS) has been introduced by IITM which is being supported by INYAS. Dr. Anoop Mahajan from IITM is the coordinator. The first and second seminars of this series were held on 24 February and 31 March 2023.

Research Proposals under "National Monsoon Mission-III": Research proposals were invited from national and international organizations/ Universities/ Institutes in the thrust areas of National Monsoon Mission-III. Formats for National and International proposals and other information were made available on the IITM, NCMRWF and MoES websites. The last date of submission was 30 January 2023.

For the first time in IITM to embark the achievements of women in the area of Weather and climate a Workshop on the role of Women in Weather and Climate Sciences (W3CS) was organised on 15 March 2023 in hybrid mode.

RESEARCH HIGHLIGHTS

Soil moisture revamps the temperature extremes in a warming climate over India

Soil moisture (SM) plays a crucial role in altering climate extremes through complex land-atmosphere feedback processes. In the present study, authors have investigated the impact of SM perturbations on temperature extremes (ExT) over India for the historical period (1951-2010) and future climate projection (2051-2100) under 4 K warming scenario. It is noted that more than 70% area of the Indian landmass has experienced significant changes in characteristics of ExT due to SM perturbations. In particular, we see larger impact of SM perturbations on ExT over the north-central India (NCI), which is a hotspot of strong SM-temperature coupling. Importantly, it is found that the impact of SM perturbations on frequency and duration of ExT events becomes less prominent with intensification of global warming. (Ganeshi N.G., Mujumdar M., Takaya Y., Goswami M.M., Singh B.B., Krishnan R., Terao T., npj Climate and Atmospheric Science, 6: 12, February 2023, DOI:10.1038/s41612-023-00334-1)



Fig. 1: Impact of SM on ExT over the NCI. Histogram compares the mean of ExTF (white), ExTD (light grey) and ExTI (dark grey) for six experiments i.e. HIST, HIST-20, HIST + 20, FUT, FUT-20 and FUT + 20, averaged over the NCI (75°E-87°E, 16°N-26°N, land only). Error bars in Figures indicate the standard deviation value of ExTF, ExTD and ExTI.

Physical evaluation of hygroscopic cloud seeding in convective clouds using in situ observations and numerical simulations during CAIPEEX

Physical evaluation of hygroscopic seeding is illustrated with in situ microphysical observations and numerical simulations in convective clouds. Large raindrops were formed near the tops of the cloud, as documented by aircraft observations and model simulations with spectral bin microphysics scheme.

Cloud residue measurements: Scattering particle number concentration and refractory black carbon in the cloud residue were found up to 4 km in the seeded cloud. The cloud residue measurements of scattering particles and the cloud droplet number concentration showed good agreement in the cloud cores and that has reduced drastically in the cloud edges.

Numerical simulations with bin microphysics using observed (background and flare) particle spectra were evaluated with in situ droplet spectra in the seeded cloud.

Extra area effects of seeding are illustrated for the first time: The clouds developed downwind of the seeded area showed further organized convection and longevity and relative enhancement of rainfall as illustrated by the radar observations and the numerical simulations compared to unseeded clouds.

Non-local impact of seeding: The non-local impacts of the seeded plume is illustrated. [Gayatri K..,

Prabhakaran Thara, Malap N., Konwar M., Gurnule D., Bankar S., Murugavel P., **Atmospheric Research**, 2 8 4 : 1 0 6 5 5 8 , M a r c h 2 0 2 3 , DOI:10.1016/j.atmosres.2022.106558, 1-17]

Northward propagation of convection over the Indian region in multi physics multi model ensemble

An assessment of a multi physics multi model ensemble (MPMME) strategy is provided to simulate the critical aspects of the Indian summer monsoon and its intra seasonal variability. Using various physics combinations of Climate Forecast System (CFS) and its atmospheric component Global Forecast System (GFS), a 15-year hindcast for May-October has been generated. Three different convective parametrizations, simplified Arakawa- Shubert (sas), revised deep-convection sas (nsas), and revised sas with modified shallowconvection (nsas_sc) are coupled with two microphysics schemes Zhao and Carr (zc) and Ferrier. MPMME members reproduce the overall characteristics of the seasonal mean, but they have significant biases over different regions. Pattern correlations reveal that CFS_nsaszc performs best among MPMME in simulating the observed characteristics of rainfall ISOs and providing significant ISO forecast up to pentad 3 lead. Vertical shear of mean zonal winds and meridional gradients of vertical winds are found to be essential in developing vorticity tendency. SCEs are better represented in CFS than in GFS. Notably, along with CFS_nsaszc, two CFS_sas members capture the



Fig.2: Different component of the evaluation: a) cloud seed particle tracking b) Model evaluation of seeding impact, c) investigation pf extra area effects with model-enhancement of graupel at several altitudes and d) with radar observations-rainfall observations

occurrence of SCEs reasonably well. However, errors in vertical shear of mean zonal winds are remarkably high after pentad 2 lead in CFS_sas and GFS, explaining their relative weakness in simulating ISOs during June–September. This study demonstrates that the MPMME strategy could utilize individual physical schemes' strengths to provide better subseasonal forecasts. (Karmakar N., Joseph S., Sahai A.K., Kaur M., Phani R., Mandal R., Dey Avijit, Quarterly Journal of the Royal Meteorological Society, 149, Pt A, January 2023, DOI:10.1002/qj.4404)



Fig.3: Difference between various model (Climate Forecast System [CFS]) physics and observed (model minus observed) June–September rainfall (colors; $mm \cdot day^{-1}$) and 850 hPa level winds (vectors; $m \cdot s^{-1}$) during 2001–2015 for pentad 1 (P1) to pentad 4 (P4) lead. Numbers in top-right corner of each panel represent the pattern correlation between observed and model rainfall over the domain

Revised cloud processes to improve the simulation and prediction skill of Indian summer monsoon rainfall in climate forecast system model

The performance of six-class weather research forecasting (WRF) single moment (WSM6) cloud microphysical scheme in the National Centre for Environmental Prediction (NCEP) Climate Forecast

System version 2 (CFSv2) at T126 (~ 100 km) horizontal resolution in the simulation and prediction skill of the Indian summer monsoon (ISM) has been investigated with 34 years of hindcast runs with 10 ensemble members. The results reveal that the revised version of CFSv2 (EXPT) shows relative improvement in summer monsoon precipitation, its variability, rainfall annual cycle, rainfall probability distribution function, synoptic and intraseasonal variance, etc. over ISM region compared to standard CFSv2 (CTRL). Robust representation of cloud hydrometeors in the WSM6 microphysics scheme leads to better large-scale precipitation distribution compared to CTRL simulation which resulted in realistic northward propagation of rainfall bands in the EXPT. Introduction of more physically based cloud physics parameterization helps to improve the cloud hydrometeor, cloud variability, and the rainfall variability. (Phani M.K.R., Ganai M., Tirkey S., Mukhopadhyay P., Climate Dynamics, Online, January 2023, DOI:10.1007/s00382-023-06674-1)



Fig.4: The annual cycle of precipitation (mmday–1) from observations (IMD and GPCP) and models (CTRL and EXPT) over a central India (74° E–85° E, 18° N–27° N) and over b Indian subcontinent. c and d Represent rainfall probability distribution function (PDF) over the same region, respectively during JJAS. X-axis indicates diferent rainfall bins (mmday–1) and Y-axis represents rainfall PDF (%)

Symmetric and asymmetric response of Indian Summer Monsoon rainfall to different ENSO decay phases in observations and CMIP6 models

The present study assesses the ability of the World Climate Research Programme's Coupled Model Intercomparison Project-6 (CMIP6) models in simulating the Indian Summer Monsoon (ISM) rainfall 4

variability and its symmetric or asymmetric relationship with the El Ninő-Southern Oscillation (ENSO) decay phase. The El Ninő decays are classified into three categories based on their transition characteristics (rapid/slow) with respect to the subsequent boreal summer season, namely El Ninő early-decay, El Ninő mid-decay, and El Nino - no-decay. Similarly, La Ninã decays are also classified into the La Ninã early-decay, La Nina ⁻ mid-decay, and La Ninã no-decay. Analysis of CMIP6 revealed that only ~ 14% of selected CMIP6 models have simulated the rainfall anomalies somewhat correctly compared to observations during summers of different decay phases of ENSO. Further, symmetric/ asymmetric response of summer rainfall anomalies over India between decay phases of El Ninó and La Ninã are not well captured by CMIP6 models. It is also noted that the CMIP6 models have displayed a tendency to simulate positive (negative) Indian Ocean Dipole conditions during the summers of El Ninó no-decay (La Nina no-decay) events unlike in the observations.



Fig.5: Composite anomalies of the El Niño early decaying (EED) summer (JJAS) precipitation (mm/day) for the (a) observations, (b) MMM-4, (c) MMM-R, (d) MMM. (e) - (h) Same as (a)–(d) but for SST (shaded; °C), SLP (contours; hPa) and 850 hPa wind vectors (m/s). (i)–(l) The same as (a)–(d) but for the Indian Ocean Dipole (IOD) index, Niño 3.4 SST, area-averaged TIO SST (20 S to 20 N and 45 E to 100 E) and area-averaged 850 hPa stream function over WNP region (10 N to 30 N and 110 E to 150 E). Dotted areas are statistically significant at the 90% confidence level.

(Chowdary J.S., Saikrishna T.S., Dandi R.A., Patekar D., Parekh A., Gnanaseelan C., Osuri K.K., **Global and Planetary Change**, 220: 104000, January 2023, DOI:10.1016/j.gloplacha.2022.104000)

Aspects of melting layer and fall streaks in stratiform cloud system over the Western Ghats, India from Kaband polarimetric radar observations

During the Indian summer monsoon, high temporal and spatial resolution observations from Ka-band dualpolarization radar deployed in the Western Ghats (WG), India are utilized to investigate the vertical structure of the stratiform precipitating system. Kaband polarimetric radar signatures near the ML are characterized by a low pHV (~0.93), high Z (~25-30 dBZ), ZDR (-3 dB), and LDR (-15 dB) values. In the stratiform precipitation region, well-defined fall streaks are observed above ML, which descends through 0°C isotherm into the rain region. When the fall streaks are present above the ML, Z increases below the ML, indicating a seeder-feeder mechanism. Because there is little observational evidence concerning the vertical distribution of stratiform clouds over the Indian subcontinent, the current study may help to understand stratiform clouds and the ice processes that occur within them. (Das Subrata K., Deshpande S.M., MuraliKrishna U.V., Konwar M., Kolte Y.K., Chakravarty Kaustav, Kalapureddy M.C.R., Sahoo S., Atmospheric Research, 281: 106463, January 2023, DOI:10.1016/j.atmosres.2022.106463)



Fig.6: Vertical profile of (a) Z (dBZ) (b) ZDR (dB) (c) ρ HV and (d) LDR (dB). The profile is plotted at ~ 10 km horizontal distance from the horizon-to-horizon scan taken on September 10, 2013, at 20:13 UTC (refer Fig. 5). A blue dashed line indicates 0°C level (at ~ 3.9 km) from radiosonde measurement for September 10, 2013, at 1200 UTC. A red line indicates the height where Z is maximum.

Impact assessment of surface ozone exposure on crop yields at three tropical stations over India

Surface ozone is a damaging pollutant for crops and ecosystems, and the ozone-induced crop losses over India remain uncertain and a topic of debate due to a lack of sufficient observations and uncertainties involved in the modeled results. In this study, authors have used the observational data from MAPAN (Modelling Air Pollution And Networking) for the first time to estimate the relative yield losses, crop production losses, and economic losses for the two major crops (wheat and rice). The detailed estimation has been done focusing on three individual suburban sites over India (Patiala, Tezpur, and Delhi) and compared with other related studies over the Indian region. The study shows that the yearly crop losses can reach the level of 12.4-40.8% and 2.0-11.1% for the wheat and rice crops, respectively, at certain places like Patiala in India. The annual economic loss can be as high as \$4.6 million and \$0.7 million for wheat and rice crops, respectively, even at individual locations in India. Our estimated %RYL (relative yield loss) lies in the range of 0.3+/0.6 times the recent regional model estimates which use only the AOT 40 metric. (Deb Roy S., Bano S., Beig G., Murthy B., Environmental Monitoring and Assessment, 195: 338, January 2023, DOI:10.1007/s10661-022-10889-w)



Fig.7: Comparison of monthly variation of AOT40 values for the year 2018 at Patiala, Tezpur, and Delhi.

IMPORTANT EVENTS

• IMS-IITM-IMD National Seminar: National seminar by Prof. Elena Surovyatkina Potsdam Institute for Climate Impact Research (PIK), Potsdam, Germany, Space Research Institute of Russian Academy of Sciences (IKI), Moscow, Russia was delivered on 17 January 2023.



• The **Rajbhasha Parliamentary Committee meeting** was held in Mumbai during the Sansadiya Rajbhasha Samithi Bhaitak on 18 Jan 2023. The institutes' good work and efforts for promotion of Rajbhasha were highly appreciated. IITM has conducted several events for the promotion of Rajbhasha during the period.



• Stakeholder Engagement Workshop on Subseasonal Prediction was conducted on 30 January 2023 via hybrid mode by ERPAS (full form) team of Monsoon Mission for forecasters, forecast-product generators and end-users as targeted audience. It was attended by 65 participants (includes 25 online). This workshop aimed to enhance the usage of forecast products in different sectors such as agriculture, health, power, hydroelectricity, etc. The details are available on IITM website.



- Program for Development of Skilled Manpower in Earth System Sciences (DESK) has conducted following Workshops:
- National Training Workshop on Paleoclimate -Archives, Proxies and Analysis/Measurement Techniques (NT-PALEO 2023): NT-PALEO 2023 was conducted by DESK and Paleoclimatology team at CCCR, IITM from 16-20 January 2023 at IITM. It was live streamed to BIMSTC (Bangladesh, India, Myanmar, Sri Lanka, Thailand, Nepal & Bhutan) nation's institute via IITM YouTube channel. The training workshop was part of the activities of the Association of Quaternary Researchers (AOQR). The workshop had lectures, hands on training experience, lab visits and field trips. Total 57 participants attended the workshop. Video playlist of this workshop is made available on IITM YouTube channel.



- National Training workshop on fundamentals of Data Assimilation (NTDA-2): An open lecture series of Advanced Level DA, AI & ML and Big Data Analysis Lectures by Prof. Laxmivarahan, George Lynn Cross Research Professor Emeritus, School of Computer science, University of Oklahoma, USA were arranged at IITM on "Role of Observability Gramain in state and Parameter Estimation in Dynamical Systems" during 6-10 February 2023: https://iitmcloud.tropmet.res.in/ index.php/s/cJgiLMKLGb8QcLK
- WCSSP Annual Science meeting: Weather and Climate Science for Service Partnership India is a collaborative science initiative between the UK and India. The WCSSP Annual Science meeting was conducted at IITM on 23 February 2023.
- National Atmospheric Chemistry Seminar Series (NACSS): The Seminar Series is supported by INYAS & Dr. Anoop Mahajan from IITM is the coordinator.

 The first seminar of this series on "Interdependence of aerosols and climate - chemistry, forcing and feedback" was delivered by Prof. Chandra Venkataraman, Indian Institute of Technology, Bombay on the topic on 24 February 2023.



 The second seminar of this series on "Urbanization and the carbon cycle: Current capabilities and research outlook in India" was delivered by **Dr. Yogesh K. Tiwari,** IITM, Pune on 31 March 2023.



- Lower Atmospheric Research Using Unmanned Aerial System Facility (LARUS): Discussion meetings with AAI and IAF officials was held to investigate the suitability of the airfields for UAV operations from 2-5 January 2023.
- A talk on the topic "Atmospheric observations of new particle formation in India" by Dr. Vijay Kanawade, Centre for Earth, Ocean and Atmospheric Sciences University of Hyderabad (an Institution of



Eminence) was arranged on 25 January 2023.

- **IITM-CDAC joint seminar** on "The Conformal Cubic Atmospheric Model and some applications" by **Dr. John McGregor**, Retired Scientist, CSIRO Australia was held in hybrid mode at the Institute on 14 March 2023.
- Workshop on the role of Women in Weather and Climate Sciences (W3CS): IITM organized Workshop on the role of Women in Weather and Climate Sciences (W3CS) on 15 March 2023 in Hybrid mode. All the events were live-streamed.



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 Virtual lecture series (Cloud and Precipitation Physics and Dynamics): 23rd lecture in the series was delivered by Dr. Yangang Liu, Senior Scientist, Brookhaven National Laboratory, Environmental and Climate Sciences Department, New York, USA on "Using knowledge on cloud microphysics and cloud-radiation interactions to improve solar irradiance forecast" on 16 March 2023. https://youtube.com/live/uiW-JDpaVWQ?feature=shar



• Annual Monsoon Workshop (AMW-2022)" and National Symposium on "Challenges in climate services for health sector in the warming environment" was held at IITM during 28-30 March 2023. Events were jointly organised by IMS Pune chapter,IITM and IMD.

IITM OUTREACH PROGRAMME

• World Meteorological Day: IITM celebrated World Meteorological Day on 23 March 2022. A Special Lecture, in line with the WMO Day theme for 2023 'The Future of Weather, Climate and Water



Across Generations' was organised. **Dr. Thara Prabhakaran,** Scientist-G & Project Director, PDTC, IITM, delivered a talk on "Water Today and Tomorrow" based on the theme of the day

• Prof. R. Ananthakrishnan Colloquium: 43rd series was presented by Dr. Bipin Kumar, Sc-E, IITM on the topic Direct Numerical Simulation (DNS) to understand droplet and aerosol dynamics on 2nd February 2023



• 44th series lecture was given by **Prof. D. Pallamraju,** Senior Professor and Dean, PRL on the topic Space Weather Science & its effect on Societal Applications on 13th February 2023.



SCIENCE POPULARIZATION ACTIVITIES

 National Science Day: IITM celebrated the National Science Day on 28 February by observing an open day at its premises. IITM also participated in the two days Science Exhibition at the Giant Metrewave Radio Telescope (GMRT) observatory at Khodad, Narayangaon from 28 February 2023 - 1 March 2023.



Open Day Exhibition at IITM and Institute's Participation at GMRT, Narayangaon

 8th India International Science Festival (IISF) – 2022, Maulana Azad National Institute of Technology (MANIT), Bhopal, 21-24 January 2023. IITM participated in 8th India International Science Festival (IISF) - 2022 Mega Science and Technology Exhibition (Expo) organized at the Maulana Azad National Institute of Technology (MANIT), Bhopal during 21-24 January 2023.



 IITM film entitled "Predicting Extreme Weather: India's New High Resolution Global Model developed by IITM" (film directed by Dr. P. Mukhopadhyay) was nominated for competition under category: Film by Institutions/ Organization, theme B: Science, Technology and Innovative to Address Climate Change. The film was screened at the International Science Film Festival of India (ISFFI) 2022, organized by Vigyan Prasar on 23 January 2023, at Bhopal.



Metropolitan Air Quality and Weather Services (MAQWS)

• Mission LiFE Activity: IITM-EIACP, RP-PC conducted Mission LiFE activities as follows. The main aim of the activities is to spread awareness and encourage people towards sustainable lifestyle for better future.

Following activities were arranged at NCL Modern English Medium School, Pashan Pune on 12 January 2023.

Natural Source based energy working model: A presentation along with hands on training of models of Green house gas effect Model, Generation of Elecricity Model and Solar Energy Model were given to 7th - 9th Standard Students. Drawing Competition: drawing competition was organized for students on the theme of "Sustainable Lifestyle". Top 5 winners were awarded with trophies and certificates.

Following activities were arranged at Shri Shivaji Vidyamandir and Kanishtha Mahavidyalaya, Pune on 17 February 2023 :

- A public talk on 'Lifestyle for Environment' for 5th to 8th standard students.
- Mission LiFE Calendar 2023 based on sustainable lifestyle action points was distributed.

- Observed "Global Recycling Day 2023" Following activities were arranged at PMC Vidyaniketan School No. 20, Pashan, Pune on 21 March 2023:
- Talk on "Importance of recycling towards Sustainable Lifestyle". Mission LiFE brochure in Hindi language was distributed to all students and teachers.
- Demonstration of Greenhouse Effect Model and the importance of reuse, reduce and recycle in reducing the effect of greenhouse gases was explained to all students.
- Model Presentation Competition on recycling and reuse: Around 40+ models were presented by students of 4th to 8th classes. In this competition, students made very innovative models, which involved recycling models/ products, vertical gardening, bestout-of-waste items, electronic equipment, biogas plants, e-waste reduce, composting models and decorative items etc.
- Prize Distribution: The event ended with Prize distribution to winners of Model Presentation Competition. Total 20 students were selected as winners and awarded with gifts.
- Climate Change Action Pledge: At all of the above schools All participants, teachers and other staff took a pledge designed under Climate Change Awareness Campaign, which contain 14 points that help us to minimize the bad effect by day to day activities. All the pledgees were given certificates and badges as climate change warrior.

SPECIAL DAYS/WEEKS OBSERVED

Azadi Ka Amrit Mahotsav: As a part of 'Har Ghar Tiranga - Azadi Ka Amrit Mahotsav', all employees of IITM recited National Anthem at Flag Post on 2 January 2023, 6 February 2023 and 6 March 2023, the first Monday of every Month.



National Voters' Day: All the employees of the Institute took the pledge on the occasion of National Voters' Day on 25 January 2023, administered by the Director, IITM. National Voters Day 2023 Theme is "Nothing like voting, I vote for sure."



74th Republic Day: Republic Day was celebrated at IITM on 26 January 2023. Director, IITM, Pune hoisted the flag and National Anthem was sung. Director addressed the employees of the institute and felicitated the winners of IITM Sports Meet 2023.



Martyrs' Day: In the memory of those who sacrificed their lives during the struggle for India's freedom, IITM employees observed two minutes' silence on 30 January 2023.

विश्व हिंदी दिवस - २०२३ समारोह (World Hindi Day) : संस्थान में १० जनवरी २०२३ को विश्व हिंदी दिवस समारोह का आयोजन किया गया । संस्थान की वेबसाइट के हिंदी संस्कारण को हिंदी में अद्यतन किया गया।



VISITORS

- Dr. Manoj K. Srivastava, Professor, Department of Geophysics, BHU, Varanasi and Dr. Mridula G., Scientist F, CSIR-National Aerospace Laboratory, Bengaluru visited IITM, Delhi Branch on 5 & 13 January 2023.
- Prof. (Dr.) Nirmali Gogoi, (Tezpur University), Dr. Sukanta Roy, Borehole Geophysics Research Laboratory (Ministry of Earth Sciences), Karad and

Dr. Nitin K. Karmalkar, Former Vice Chancellor (University of Pune) on 4 & 19 January 2023.



• Dr. M. Ravichandran, MoES Secretary visited Atmospheric Research Testbed, MP along with MoES officials & other delegates on 21 January 2023



- Dr. D.R. Pattanaik, Head, Numerical Weather Prediction Division, India Meteorological Department (IMD), New Delhi, visited IITM-COSMOS site for scientific activities on 31 January 2023.
- **Prof. (Dr.) Pavel Kabat,** Secretary General, The International Human Frontier Science Program Organization (HFSPO), Formerly Chief Scientist, and The World Meteorological Organization (WMO) of the



United Nations visited IITM-COSMOS site for scientific activities on 15 February 2023. He delivered a talk on "Inclusion of Biology in Climate Change Modeling" on 17 February 2023.

• Dr. Jeff Lapierre, Lightning Scientist at Earth Networks, Gaithersburg, Maryland, United States visited IITM and delivered a lecture "Lightning Detection Network and Its Application for Research" on 22 February 2023.



• A group of students of M.Sc. (Tech.) Geophysics (Specialization in Meteorology) Department of Geophysics, BHU, Varanasi visited the Branch Office, 7 February 2023 for their Educational Trip.

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- A group of students of B. Tech. from Rajkiya Engineering College, Mainpuri, UP visited the Branch Office (BO) on 9 February 2023.
- Prof. Laxmivarahan, George Lynn Cross Research Professor Emeritus, School of Computer science, University of Oklahoma, USA visited IITM during 6-10 February 2023 to deliver lecture series for the National Training



workshop on fundamentals of Data Assimilation (NTDA-2).

• Dr. Alex Kinsella, Woods Hole Oceanography Institute, USA, who is currently visiting IITM for two weeks. He delivered a lecture "Meridional SST Gradients and Intraseasonal Rainfall Variability



in the Bay of Bengal" on 9 March 2023.

• Dr. John McGregor, Retired Scientist, CSIRO Australia, Dr.Shailesh Nayak, Director, National Institute of Advanced Studies Bangalore and Prof. (Dr.) Prasad Bhaskaran, IIT Kharagpur, visited IITM-COSMOS site for



scientific activities on 11, 13 & 18 March 2023 respectively.

- ITM-CDAC joint seminar by Dr. John McGregor, Retired Scientist, CSIRO Australia was held on "The Conformal Cubic Atmospheric Model and some applications", 14 March 2023.
- Ms. Suranjana Das, Program Manager at USIEF (United States-India Educational Foundation), Fulbright Commission in India delivered a Seminar on the Fulbright fellowship opportunities on 17 March 2023.
- 20 students of grade VIII of Narayana e-Techno School, Wagholi, Pune along with three staffs, 3 March 2023.
- 100 students of second year engineering and 2 senior faculty members from Department of Information Technology, Rajarshi Shahu College of Engineering, JSPM, Pune, 10 March 2023

- 80 BCA Students, along with three faculties of Sri Shahu College, Parvati, Pune visited Institute 13th March 2023
- 100 BE computer Students, along with four faculties of Department of Computer Engineering, D. Y. Patil College of Engineering Akurdi, Pune, visited Pratyush HPC on 17th March 2023
- Two trainees Batches AMTC visited Pratyush HPC on 20th March 2023
- 160 Engineering students with faculty members of Jayawantrao Sawant College of Engineering, Hadapsar, Pune, visited HPC Pratyush on 23rd March 2023
- 70, 3rd year IT students and 2 faculty members of Government Polytechnic, Pune visited HPC Pratyush on 24th March 2023.
- 100 sudents of Jaihind Polytechnic, Kuran, Tal-Junnar, Dist-Pune visited Pratyush HPC on 27th Mar 23.

IITM Participation in Important Meetings/ Events

- iLEAPS Oz-Flux Joint Conference from 30 January 2023 to 4 February 2023 at Auckland University of Technology, Auckland, New Zealand.
- Workshop on National Lightning Risk Mitigation Programme (NLRMP) organized by National Disaster Management Authority (NDMA) on 11 January 2023 at NDMA, New Delhi. UAE NCM/IREF rain enhancement forum during 24-26 January 2023.
- CLIVAR/GEWEX Monsoons Panel (MP 2023-1) meeting on 31 January 2023.
- 6th IIOE-2 Steering Committee meeting and IORP-18/ IRF-17/ IOGOOS-18/ SIBER-13 annual review meeting, hosted at the International Indian Ocean Science Conference (IIOSC 2023) in Perth, Australia, 6-10 February 2023.
- CLIVAR workshop on the tropical Pacific and its inter-basin interactions at the University of Monash, Melbourne, Australia, on 13 February 2023.
- 4th WCSSP India Annual Meeting held at NCMRWF Noida on 27 February to 3 March 2023.

- South Asian Nitrogen Hub (SANH) RP4 Meeting, 28 February 2023.
- 4th Weather and Climate Science for Service Partnership (WCSSP) India Annual Meeting, NCMRWF, 27 February to 3 March 2023.
- Safe Landing Climates Lighthouse Activity Working Group Meeting organised by World Climate Research Programme (WCRP) at the Royal Society, London, 7-9 March 2023.
- International Conclave on the Use of Advanced Technologies in Disaster Management, held at USDMA, Dehradun, 21-22 March 2023.
- Joint EPESC-DCPP workshop/ meeting, UK Met Office, Exeter, UK, 22-24 March 2023.

ACADEMIC ACTIVITIES

- **Ph.D. admissions through AcSIR at IITM** The institute has signed an agreement (MoU) with the Academy of Scientific and Innovative Research (AcSIR) for Ph.D. program on 25 January 2023. Under this MoU, IITM has become an Associate Academic Centre of AcSIR and can admit Ph.D. students through AcSIR channel who would work for Ph.D. degree of AcSIR.
- PhD synopsis and PhD proposal seminar were conducted for IITM research scholars and scientists pursuing PhD degrees from different universities:

Ms. Chaitri Roy

• Variability of Ozone and its precursors in the upper troposphere and lower stratosphere (UTLS) over the Asian region, 11 January 2023, Guide: Dr. Suvarna Fadnavis, Co-guide: Dr. R. Krishnan



Mrs. Nimya S. S.

 Process modeling of stable water isotopes during Indian Summer Monsoon in connection to paleoclimate interpretation, 3 February 2023, Guide: Dr. Saikat Sengupta



Mrs. Pallavi S. Buchunde

• Carbonaceous aerosols over a high altitude location: Temporal variation and the formation of new particles and associated cloud condensation nuclei, 9 February



2023, Guide: Dr. P.D. Safai, Co-guide: Dr. G. Pandithurai

Mrs. Lekshmi Mudra

 Monsoon Precipitation Response over the Indus valley to Mid-Holocene forcing, 15 February 2023,Guide: Dr. Sabin T. P., Co-guide: Dr. R. Krishnan, <u>https://youtube.com/live/8jm-JlpZEJA?feature=share</u>

Mrs Sreyashi Debnath

•Understanding atmospheric chemistry-climate interaction over the Indian sub-continent. Guide: Dr. Sachin Ghude 24 March 2023 <u>https://youtube.com/live/K mBa-5xWak?feature=share</u>

Mr. Mandal Raju (SPPU)

• Development of Extended Range Prediction strategy of extreme temperature events over Indian region for societal benefits, Guide: Dr. Joseph Susmitha, Co-Guide : Dr. Sahai A.K., 24 March 2023



Sh. Narayansetti Sandeep (SPPU)

 Teleconnections of the North Atlantic with the Asian monsoon in a warming climate. Guide: Dr. Panickal Swapna, Co-Guide: Dr. R. Krishnan, 27 March 2023

Ph.D. THESIS AWARDED

Ms. Darshana Patekar (SPPU)

• The Indo-Western Pacific climate variability and influence on Indian Summer Monsoon rainfall from interannual to interdecadal time scales. Guide : Dr. J.S. Chowdary, Co-Guide: Dr. C. Gnanaseelan., January 2023



Smt. Renu S. Das

• Best oral presentation award by the National Symposium on "Challenges in climate services for health sector in the warming environment", jointly organised by IMS Pune chapter, Indian Institute



of Tropical Meteorology and India Meteorological Department during 28-30 March 2023.

Ms. Aditi Modi

• Working member of IIOE-2 under the science theme -Unique geological, physical, biogeochemical and ecological characteristics of the Indian Ocean during the 6th Steering committee meeting of IIOE-2



held in Perth, Australia during 6-10 February 2023.

Sh. Subrata Mukherjee

 Best poster award (1st) in International Symposium on "Secondary Aerosol Formation and Growth-2023 (NANO23)", University of Hyderabad, 13-14 March 2023.



Dr. Pramit Kumar Deb Burman

 Chaired, technical session, National conference "'Land-Atmosphere Interactions Controlling Weather & Climate: Applications of Numerical Models and Observations (LAI-2023)', NIT Rourkela, 09 -12 January 2023.



 Resource person at the four-day scientific event entitled 'Reckoning Hazards and Disasters - A Geographical Approach' organised by the Department of Geography at the Sir Parashurambhau (SP) College Pune on 16 February 2023. This event was sponsored by MHRD, GoI, under the 'Rashtriya Uchastar Shiksha Abhiyan (RUSA) 2.0' scheme.

Mrs. Pallavi Padwal

 Best poster award (1st consolation) in International Symposium on "SecoNdary Aerosol FormatioN and GrOwth-2023 (NANO23)", University of Hyderabad, 13-14 March



Mr. Avishek Ray

 3rd prize, Dr. S.K. Ghosh Memorial Young Scientist Award by Indian Meteorological Society, Kolkata chapter on 23 March 2023



Dr. E.N. Rajagopal

 Chaired Plenary Session 2 on "Work Package-3 & Work Package-4 Focus" in the WCSSP India Annual Science Meeting at NCMRWF during 28 February-3 March 2023.

DEPUTATION ABROAD

Dr. C. Gnanaseelan

• Attended the Joint EPESC-DCPP workshop/ meeting at UK Met Office, Exeter, UK from 22-24 March 2023.

Dr. Thara Prabhakaran

- Invited by the National Centre for Meteorology (NCM) United Arab Emirates (UAE) to participate in the 6th International Rain Enhancement Forum (IREF) held during the period of 24-26 January 2023 in Abu Dhabi, UAE.
- Participated in the "Cloud-Climate Interactions across scales" conference at Eilat, Israel from 27 February to 2 March 2023.

Dr. S.D. Ghude

- Chaired the iLEAP SSC meeting and participated in iLEAPS-OzFlux conference at Auckland University of Technology (AUT), Auckland, New Zealand during 27 January to 2 February 2023
- Visited NCAR, Boulder, USA from 13 February to 10 March 2023 for implementation plan on the Delhi air quality forecasting system project for several

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Sh. Kalshetti Mahesh Prabhuling (SPPU)

• Extratropical-Tropical Interaction in the Subseasonal to Seasonal Scale over the Indian Region, Guide: Dr. Chattopadhyay Rajib, Co Guide: Dr. R. Phani Murali Krishna, December 2022



Ms. Monalisa Sahoo (SPPU)

 Interannual Variability and Teleconnection of Indian Summer Monsoon over Major Homogeneous Regions of India, Guide : Dr. Ramesh Kumar Yadav, February 2023



 The paper entitled "A diagnostic study of cloud physics and lightning flash rates in a severepremonsoon thunderstorm over northeast India" by Choudhury B.A., Konwar M., Hazra A., Mohan G.M., Pithani P., Ghude S.D., Deshamukhya A., Barth M.C., Quarterly Journal of Royal Meteorological Society, 146, 2020, DOI:10.1002/ qj.3773, has been featured by American Geophysical Union (AGU) as a Science highlight for the month of February 2023.

Dr. Thara Prabhakaran

• Member, Earth & Atmospheric Sciences Preliminary Screening Committee of SERB-POWER (Promoting Opportunities for Women in Exploratory Research) Power Grant.

Dr. G. Pandithurai

- Chaired a session, "Improving prediction of visibility and fog over the Indian subcontinent" in the 4th WCSSP India Annual Science Workshop held at NCMRWF on 1 March 2023.
- "Chemical Nature of Nanoparticles" in the International Symposium on SecoNdary Aerosol FormatioN and GrOwth-2023 jointly organized by University of Hyderabad and Finnish Meteorological Institute on 14 March 2023 and delivered a Keynote lecture on Aerosol-cloud-precipitation interactions: An uncertain component of the climate system.

Dr. P. Mukhopadhyay

• Elected as the Fellow of Indian Academy of Sciences, Bengaluru in 2022 (effective from 2023).



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- Member, Working Group on Tropical Meteorology Research of the World Weather Research Programme (WWRP) w.e.f. 20 February 2023.
- Facilitated by Indian Meteorological Society, Pune for his outstanding contribution in the field of Atmospheric Sciences and on being elected as a Fellow of Indian Academy of Sciences, Bengaluru, 28 March 2023.



Dr. Susmitha Joseph

• Appointed by the WWRP/ WCRP Sub-seasonal to Seasonal Prediction (S2S) Project to manage S2S Regional Activities wikis for South Asia.

Dr. Roxy Mathew Koll

• Appointed as a WCRP CLIVAR Scientific Steering Group (SSG) member for the period 2023-2036.





- Chaired the session on "The future of observations" at The NEW NORMAL Indian Ocean workshop, organized by the National Oceanography Centre (NOC) at Southampton, UK, on 1 February 2023.
- Member of the CLIVAR Research Foci group on Marine Heatwaves in the Global Ocean.

Dr. Atul Kumar Srivastava

 Served as Jury Chair for the Young Scientist Conference (YSC) in the Indian International Science Festival (IISF-2022), held at MANIT, Bhopal during 21-24 January 2023.



cities in India as well as a machine learning-based decision support system for New Delhi.

Dr. Swapna Panickal

• Attended the Safe Landing Climates Lighthouse Activity, Working Group Meeting organized by World Climate Research Programme (WCRP) at Royal Society, London during 7-9 March 2023.

Dr. Roxy Mathew Koll

- Chaired the new Normal Indian Ocean Workshop organized by the National Oceanography Centre (NOC) at Southampton, United Kingdom during 26 January to 2 February 2023.
- (i) organize, chair and deliver talks at International Indian Ocean Science Conference (IIOSC 2023); (ii) delivered an invited lecture and participated in panel discussions on tropical basin interaction at the CLIVAR Research Foci meeting at Perth and Melbourne, Australia during 6-17 February 2023.

Dr. Yogesh K. Tiwari

• "World Meteorological Organization (WMO) organized International Greenhouse Gas Monitoring Symposium" during 30 January to 1 February 2023 and the IG3IS Stakeholder Consultations and User Summit, 2-3 February 2023, Geneva, Switzerland.

Dr. Shikha Singh and Dr. Aditi Modi

 Participated in the 6th IIOE-2 Steering Committee meeting and IORP-18/ IRF-17/ IOGOOS-18/ SIBER-13 at the International Indian Ocean Science Conference (IIOSC 2023) at Perth, Australia, 6-10 February 2023.

Smt. Sreyashi Debnath

• Participated in iLEAPS-OzFlux conference at Auckland University of Technology (AUT), Auckland, New Zealand, 30 January to 4 February 2023.

Shri Ajit Prasad P. and Shri Hans Pratap Singh

• 12th World Hindi Conference at Nadi, Fiji, 15-17 February 2023.



Editorial Team

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