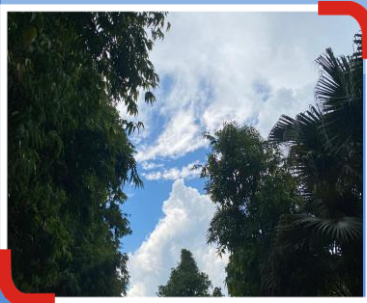




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Important Events

To commemorate the 150 years of foundation of IMD, the Hon'ble Minister of Earth Sciences (HMOES) **Shri Kiren Rijiju** graced the occasion as the Chief Guest and released the logo 150 years of service to the nation on 26th December, 2023. **Dr. M. Ravichandran**, Secretary, Ministry of Earth Sciences (MoES), **Dr. Mrutyunjay Mohapatra**, DG IMD, **Dr. S. Pandian**, Joint Secretary MoES, **Shri Vivek Sinha**, Sc.G, IMD & Co-Chair Local Organising Committee and **Mrs. Ranju Madan**, DDG(Administration), IMD & Co-Chair LOC also graced the occasion. The logo release ceremony was also attended by various sister organisations of IMD, central and state Govt. agencies and print and electronic media, in person and online mode. Detailed Press Release issued in this regard is available at the link: https://internal.imd.gov.in/press_release/20231226_pr_2716.pdf.

Logo release video is available at the link: <https://youtu.be/Q9aGatf7b9c>



Logo released to commemorate 150 years of IMD to the Service of Nation



Shri Kiren Rijiju, Hon'ble Union Minister of Earth Sciences and other Dignitaries during Logo released

Dr. Mrutyunjay Mohapatra, DG, IMD, PR of India to WMO and 3rd Vice President of WMO participated as Guest of Honour and led the Indian delegation to the 50th session of World Meteorological Organisation/Economic and Social Commission for Asia and the Pacific (WMO/ESCAP) Panel on Tropical Cyclones (PTC) in Bahrain during 19th - 23rd December, 2023.

Dr. D. R. Pattanaik, Sc.-G and **Mrs. Monica Sharma** Sc.-D were part of the team. In his speech, Dr. Mohapatra highlighted the role of India in building the Tropical Cyclone Forecasting System over the region. During the 50th Session of PTC, India got elected to host PTC Secretariat during 2024-2028.



Dr. M. Mohapatra, DG, IMD addressing during Inaugural of 50th Session of PTC



Group Photograph after election of India to host WMO/ESCAP Panel on PTC Secretariat during 2024-2028



Significant Events

IMD organised a Technical Conference on “Advancements of Cyclone Warning services through WMO/ESCAP Panel on Tropical Cyclones” on 19th December, 2023 prior to the 50th PTC Session and also made presentations during the 50th Session of PTC. Dr. D. R. Pattanaik, Scientist G and Head RSMC made a presentation on (i) Activities to commemorate 50 years of establishment of PTC, (ii) Tropical Cyclone Impact based forecast and Risk Assessment through Web based Dynamic Composite Risk Atlas. Mrs. Monica Sharma, Scientist D made a presentation on (i) Gaps and Challenges in Tropical Cyclones monitoring and forecasting over North Indian Ocean, (ii) Review of cyclone season 2022 and 2023 during PTC-50 Meeting on 20th December, 2023 and (iii) Tropical Cyclone Operation Plan (TCP-21) (Edition 2023) as Rapporteur during PTC-50 meeting. **The WMO/ESCAP PTC appreciated the tropical cyclone advisory services and other supports provided by IMD.** WMO/ESCAP PTC also appreciated IMD for providing tropical cyclone forecasters training to WMO/ESCAP Panel countries in 2023.

Delegation from Ghana, visited India Meteorological Department on 23rd November, 2023 to have an overview of the forecasting techniques and practices at India Meteorological Department on 23rd November, 2023. The team visited National Weather Forecasting Centre in IMD.

Hon’ble Union Minister of Earth Sciences, Shri Kiren Rijiju chaired a Review Meeting on 26th December, 2023. DG, IMD along with other senior officers of IMD attended the meeting. A presentation was made by IMD on “Field trial on the AWS using a Direct Methanol Fuel Cell along with a Solar panel”.

Human Resource Development Activities

WORKSHOP

The Office of Climate Research and Services (CRS) organized a **"Stakeholder Consultation Workshop For the Development of National Framework for Climate Services in India (NFCS-India)"** at Lavasa, Pune during 5-6 October, 2023.

A Stakeholder Consultation Workshop for Establishing the National Framework for Climate Services in India was organized by the India Meteorological Department (IMD), under the MoES, Government of India, and co-hosted by Christ University at Lavasa, Pune, Maharashtra, from 5-6 October, 2023. The participants in this event included a wide range of experts relevant to climate services in the country, such as representatives from various central ministries (including earth sciences, water resources, agriculture, health, energy, defence and space), officials

from various state governments, research organizations, academic institutions, professional bodies, industries, non-governmental organizations, students, and the media. The workshop was structured with many presentations and talks by NFCS experts (national as well as from WMO), experts from the five GFCS priority areas (water, agriculture and food security, energy, health, and disaster risk reduction), Indian Navy, ISRO, state governments, and several others. Following detailed presentations and discussions focused on the development of well-coordinated climate services in the country, the participants have broadly agreed on a roadmap ahead to ensure the successful establishment and implementation of NFCS-India.



NATIONAL FRAMEWORK FOR CLIMATE SERVICES IN INDIA (NFCS-INDIA) 5-6 OCTOBER 2023, LAVASA, PUNE

Dr. A. K. Mitra, Sc-F, delivered an invited lecture at 2nd Indian Space Conclave from 9-11th October, 2023 at the Manekshaw Centre in New Delhi.

Shri Raja Acharya, Met.-A, attended the webinar on "Disaster risk reduction in the digital transformation age: Leveraging emerging technologies" on 13th October, 2023 conducted by WMO/ITU and participated online in the "Ocean Best Practices System(OBPS) workshop" held during 9-13 October, 2023 organised by the Intergovernmental Oceanographic Commission(UN).

Shri Ramashray Yadav, Sc-D, attended 24th International SST Users Symposium during 16-20 October, 2023 organised by ISRO Ahmedabad.

Dr. Divya Surendran, Sc-D, attended the Workshop on Vector Borne Diseases For Field Workers organised by Pune Knowledge Cluster in collaboration with the District Malaria Office, Pune on 26th October, 2023 at Primary Health Centre, Wagholi, Pune.

Shri Raja Acharya, Met.-A, participated online in the **"7th International Port Meteorological Officers Workshop"** held in hybrid mode during 31st October, 2023 - 2nd November, 2023 organised by the WMO and Intergovernmental Oceanographic Commission (UN).

Meeting at MoES was held on 16th November, 2023 in the presence of **Dr. M. Ravichandran**, Secretary, MoES and **Dr. M. Mohapatra**, DG, IMD and **Dr. A. K. Mitra**, Sc-F, IMD to review the report on INSAT 4th generation satellite requirements.

Shri Raja Acharya Met.-A, Participated in the "3rd and 4th session of the Online Workshop on weather & climate services for the energy and related sectors in South America" held on 17th November and 20th November, 2023 organised by the WMO .

Dr. M. Mohapatra, DG IMD participated in the Inaugural ceremony of the Conference on G-20 Disaster Resilient Infrastructure at Scope Conference Hall, New Delhi on 18th November. He also participated in the Panel Discussion - 2 on "Reducing Disaster Risk & Building of the Delhi State Chapter – NAREDCO" on 18th November, 2023.

Dr. M. Mohapatra, DG IMD, participated in the Inaugural Ceremony of **TROPMET 2023** as a Guest of Honour organized by India Meteorological Society and Birla Institute of Technology, Mesra, Rajasthan on 21st November, 2023. He also delivered the key note presentation on National Framework of Climate Services.

Dr. M. Mohapatra, DG IMD participated in the first WMO Technical Coordination Committee on 22nd and 23rd November, 2023 through VC.

Dr. (Smt) Manorama Mohanty, Sc-E, M.C. Ahmedabad and **Shri Kirit G Kacha**, Met-B participated in NATPOLREX-IX at Vadinar organized by Indian Coast Guard on 24-25 November, 2023.



Dr. (Smt) Manorama Mohanty at NATPOLREX-IX Vadinar

Dr. Satya Prakash, Sc-D participated and presented IMD satellite data policy in WMO Core Satellite Data Workshop at Geneva from 5-7 December, 2023.

Shri Ramashray Yadav, Sc-D attended a online meeting of WMO Workshop on Aircraft based Water Vapour Measurements for Aviation applications on 7-8 December, 2023.

MEETINGS / CONFERENCES

Dr. M. Mohapatra, DG IMD participated in the Climate Services User Forum Session of South Asian Climate Forum -26 through VC on 3rd October, 2023.

Dr. M. Mohapatra, DG IMD participated in the Online meeting with Mr. Abdulla Al Mandous, President, WMO on 5th October, 2023.

Dr. M. Mohapatra, DG IMD participated in the Meeting of the National Crisis Management Committee under the Chairmanship of Cabinet Secretary to review the status of Sikkim Flash Flood incident at Committee Room, Cabinet Secretariat on 9th October, 2023.

Dr. M. Mohapatra, DG IMD participated in the WMO's Joint WMO-IOC Collaborative Board Meeting as Co-chair on 10th October, 2023.

Dr. M. Mohapatra, DG IMD participated in the meeting with **Dr. M. R. Ravi**, IAS, Managing Director and Brig. D. M. Purvimuth, Technical Advisor, KSIIDC, Bangalore regarding meteorological services of Vijayapura and Hassan Airports in Karnataka and draft Memorandum of Understanding on 10th October, 2023.

Dr. M. Mohapatra participated in the meeting of the Sir Gilbert Walker Gold Medal Committee at the chamber of Secretary, MoES on 11th October, 2023.

Dr. M. Mohapatra, DG IMD participated in the Virtual Meeting on Indian Lightning Detection Network (ILDAN) under the Chairmanship of Secretary MoES on 12th October, 2023.

Dr. M. Mohapatra, DG IMD participated in the 4th SRMC Meeting of Monsoon Mission at IITM, Pune in person during 12 & 13 October, 2023.

Dr. M. Mohapatra, DG IMD participated as an Expert Speaker in the Show Perspective on "National Framework for Climate Services" at Sansad Television on 25th October, 2023.

Shri S. C. Bhan, Sc-G and Head AASD chaired the launching of GKMS Sarpanches of Bhiwani block, Haryana held on 20th October, 2023.

Shri K. C. Sai Krishnan, Sc-G, attended the virtual meeting on 20th October, 2023 regarding economic and technology cooperation chapter of ETCA between India and Sri Lanka.

A meeting was held **between IMD and SAC, ISRO** on dated 3rd November, 2023 regarding the navigation issues of INSA3D/3R.

Dr. M. Mohapatra, DG IMD participated in the meeting of Sub-Committee of National Executive Committee (SC-NEC) to consider the proposals of Urban Flood Risk Management Programme (UFRMP) of NDRF in respect of the states of Bengaluru and Ahmedabad on 15th November, 2023.

Dr. D. S. Pai, Sc-G, attended the Standing Committee on Energy (2023-24)-Examination of the subject- Prospects of Thermal Power Plants in the light of enhanced Renewable Energy Target, held on 22 November, 2023 at Main committee room at Parliament.

Dr. M. Mohapatra, DG IMD participated online in the third South Asia Hydromet Forum (SAHF) Executive Council Meeting convened by Regional Integrated Multi-hazard Early Warning System (RIMES) through hybrid mode on 30th November, 2023.

Dr. M. Mohapatra, DG, IMD participated in 15th Regional Integrated Multi-hazard Early Warning System for Asia & Africa (RIMES) Council Meeting through hybrid mode on 1st December, 2023.

Dr. M. Mohapatra, DG IMD participated in the meeting of the National Crisis Management Committee Meeting on 1st December, 2023 in association with cyclone Michaung over the Bay of Bengal.

Dr. M. Mohapatra, DG IMD participated in the National Crisis Management Committee meeting chaired by Cabinet Secretary on 1st and 3rd December, 2023 in connection with cyclone, Michaung and made presentation on current status, forecast and early warning, impact expected and actions to be taken due to the cyclone.

Dr. M. Mohapatra, DG IMD attended the inaugural session of training programme seasonal forecast training for Department of Meteorology, Sri Lanka on 4th December, 2023.

Dr. M. Mohapatra, DG IMD participated in the WCSSP Executive Committee Meeting on 4th December, 2023.

Mrs. Monica Sharma, Sc-D Participated in the WMO RA-II Technical Workshop on Marine and Coastal Services at

Japan Meteorological Agency, Tokyo during 4-7 December, 2023.

Dr. M Mohapatra, DG IMD addressed the participant in the inaugural ceremony of on Job Training program organized by MWO Palam on 6th December, 2023.

Dr. M. Mohapatra, DG IMD participated in the meeting of the Peer Advisors for Mauritius through on 6th December, 2023.

Dr. M. Mohapatra, DG IMD participated in the meeting with **Shri Dibyanshu Prasad Das**, Program Director alongwith team of SARM regarding Agri Vision 2024 on 11th December, 2023.

Dr. M. Mohapatra, DG, IMD attended the roundtable discussion on "**Fostering spatial thinking in Young Minds**" organised by Geospatial Association on 11th December, 2023 at Tamarind Hall, India Habitat Centre, New Delhi on 11th December, 2023.

Dr. M. Mohapatra, DG IMD participated as a Panelist in the 9th CII Water Innovation Summit on 12th December, 2023.

Dr. M. Mohapatra, DG IMD addressed the gathering in the 3rd Meeting of the BIMSTEC Centre for Weather & Climate (BCWC) Governing Body (GB) on 13th and BCWC Scientific Advisory Committee (SAC) on 14th December, 2023.

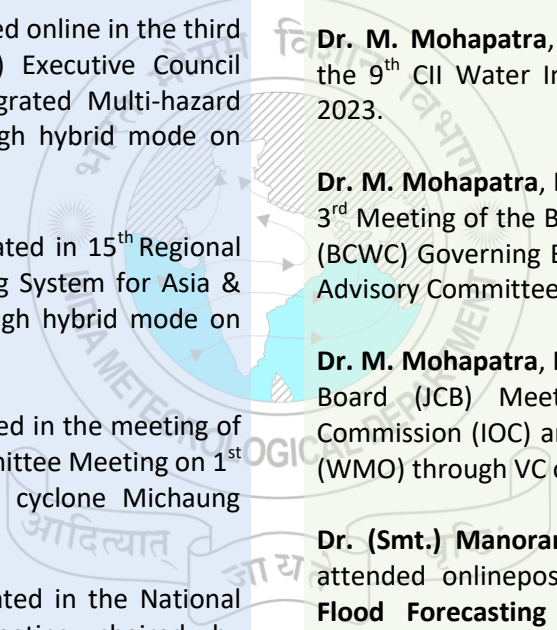
Dr. M. Mohapatra, DG IMD Chaired the Joint Collaborative Board (JCB) Meeting of Intergovernmental Oceanic Commission (IOC) and World Meteorological Organisation (WMO) through VC on 15th December, 2023.

Dr. (Smt.) Manorama Mohanty, Sc-E, M.C. Ahmedabad attended onlinepost monsoon **Inter State Meeting on Flood Forecasting arrangements (Monsoon-2023) for Tapi, Lower Narmada & Daman Ganga Basin** at CWC Surat on 15th December, 2023 organized by CWC Gandhinagar.

Dr. M. Mohapatra, DG IMD participated in the 1st Indian Arctic Winter Expedition Launching Function on 18th December, 2023 chaired by HMoES.

TRAININGS

Integrated Meteorological training Course: This course is conducted for a period of four months. This is an introduction course for the fresh entrants and also for recording real time observations, current weather and other related subjects. January to December, 2023 MIT, Pune has conducted 2 batches and trained 117 personnel.



Forecaster Training Course : This course comprises of 2 months E-learning and 4 Months class room learning along with On Job training. This course is offered to the senior employees who are likely to be promoted to the Group A posts where forecasting for various users is the primary requirement. FOUR batches were called for training during the year 2023-24. This unit has imparted training for 69 candidates during this period and 40 names have been nominated for the batch from 9th October, 2023 onwards.

An online refresher training course in Aviation Meteorology-(part 2) held on 07th November, 2023 for all the officials of IMD.

An online training on implementation of Integrated Aviation Message submission and Report Generation System at airports was held on November 09, 2023 for all the AMOs and AMSs.

Shri Thangjalal Lhovum, Sc-D attended a virtual WMO Energy training course during 17- 20 November, 2023.

Dr. (Smt.) Manorama Mohanty, Sc-E, M.C. Ahmedabad, Shri Ramashray Yadav, Sc-D, Shri Abhimanyu Chauhan, Sc-C, Shri Y. D. Bijani, Met-B , Smt. S. N. Bhat, Met-B, Shri A. R. Khlas, Met-A and Shri N.S. Darji, Met-A participated in online training on Cyclone & Marine Services (Bulletin & Products) organised by RSMC during 13-16 December, 2023.

Agrimet Division, IMD, Pune and Department of Meteorology Srilanka jointly organised a five-day training on **“Improvement of Agricultural Meteorological services using the latest remote sensing tools”** at O/o CR&S, IMD, Pune from 11- 15 December, 2023.

A **“Customized Tailor-Made Meteorological Training”** programme commenced on 20th November to 15th December, 2023 for 5 Meteorological Trainees from Bhutan.

Fifteen IAF personnel who have been deployed to Myanmar for the installation of Meteorological Instruments were imparted training in the **‘Installation, Operation and maintenance of Aviation Meteorological Instruments’** from 6-8 December, 2023.

CWD conducted a Refresher Training Course on marine Weather Forecasting and Cyclone Warning: Standard Operation Procedure during 13-16 December, 2023.

Officers (13) of RMC Nagpur attended refresher course on **“Networking”** from 20-24 November, 2023 organised by ICITC, ISSD, New Delhi.

Officers (10) of RMC Nagpur attended refresher course on **“Database Management”** from 18-22 December, 2023 organised by ICITC, ISSD, New Delhi.

LECTURES/TALK/ WEBINAR

India Meteorological Department organized a series of lectures with **Permanent Representatives and Eminent Scientists from various WMO/ESCAP Panel on Tropical Cyclones** member countries during August-November, 2023. Special wrap up Session of the series was organized on 20th November, 2023. **Mrs. Monica Sharma, Sc. D** made a presentation on the activities initiated by IMD to commemorate 50th year of formation of WMO/ESCAP Panel on Tropical Cyclones. The session was chaired by **Dr. M. Mohapatra, DG IMD**. During his concluding remarks he highlighted the importance of regional association in minimizing death and damage due to tropical cyclones in the region.

Dr. Rajib Chattoopadhyay, Sc- E and Dr. Divya Surendran, Sc-D attended the Stakeholder Consultation Workshop for Development of National Framework for Climate Services in India(NFCS-India) from 5th to 6th October, 2023 at Christ University, Lavasa, Pune organised by O/o CRS, IMD, Pune.

Dr. Divya Surendran, Sc-D attended online and presented a poster on **"An overview of the climate indices related to health sector over Kerala State, India"** in the WCRP open Science conference on 9th October, 2023.

Dr. Ananya Karmakar, Sc-D presented poster and short oral presentation in WCRP OSC 2023 on 11th October, 2023 entitled **"Indian Extreme Rainfall Events Frequency in different climatological epochs"**.

Shri Thangjalal Lhovum, Sc-D visited Department of Geography, Synod College, Shillong on 7th November, 2023 for a one day special lecture on **“Understanding IMD forecast and its application in daily life”**.



Shri Thangjalal Lhovum, Sc-'D' & Head, M.C. Shillong delivering special lecture

Dr. M. Mohapatra, DG IMD delivered lecture (online) on Meteorological Science : Recent Advances in NIAS-DST Training Programme on “**Science & Technology : Global Developments and Perspectives**” organized by NIAS, Bengaluru on 24th November, 2023.

Dr. M. Mohapatra, DG IMD participated as Chief Guest in the Panel Discussion: on “**Strategies for Building Geo Resilience in the Face of Disaster**” in the Geo Resilience Symposium organized by Association of Geospatial Industries (AGI) on 28th November, 2023.

A customized training programme has been prepared for 8 trainees from Met. Bhutan scheduled from 20th November to 15th December, 2023.

Scientists from Agrimet division, IMD, Pune delivered the following lectures during the training programme on “**Improvement of Agricultural Meteorological services using the latest remote sensing tools**” on 11-15 December, 2023.

Dr. Kripan Ghosh, Head, Agrimet Division delivered the lectures on ‘**Concept of Operational Agromet Advisory Services and existing system in India**’ and ‘**Analysis and management of climatic risks in Agriculture using crop simulation model (CSM)**’ - by.

Dr. Ashutosh Kumar Misra, Sc-D, delivered the lectures on ‘**Impact based Forecast (IBF) for Agriculture**’, ‘**Outreach and Dissemination of AAS**’, ‘**Introduction to CSM**’ and ‘**Water budgeting and scheduling of irrigation**’.

Dr. Ashutosh Kumar Misra, Sc-D and **Dr. Jaya Dhama Parihar**, Sc-D delivered the lectures on ‘**Use of decision support systems in preparation of Agromet Advisories**’.

Dr. Asha Latwal, Sc-C, delivered the lectures on ‘**Various agromet products and their applications for appropriate decision making in Agricultural operations**’, ‘**Basics of Remote Sensing and its Applications in Agriculture**’ and ‘**Crop Weather Calendar, Pest Weather Calendar, Feedback on AAS & Impact Analysis**’.

Shri Shibin Balakrishnan, Sc-D, imparted two online lectures on the “**Analysis of Tropical Cyclones using satellite observations and derived products giving specific examples of applications in real-time forecasting**” in the South Asian Meteorological Lecture (SAMA) series during December, 2023.

FOREIGN DEPUTATION

Shri Asok Raja, Sc- D, visited in Cambodia and Lao PDR for FFGS Refresher & Hands-On Operational training for the Southeast Asia Flash Flood Guidance System (SeAFFGS), 4-11 October, 2023.

Shri Dinesh Kumar, Met-B, visited Jakarta, Indonesia for WIS 2.0 Training workshop in Jakarta, Indonesia 9-13 October, 2023.

Shri Sunny Chug, Sc-D, visited Geneva to attend 2023 CAP Implementation Workshop and Training Course scheduled which was held from 10-12 October, 2023.

Shri Bibraj, Sc-D and **Shri Rohit Shukla**, Sc-D visited Tokyo attend JMA Weather Radar Workshop which was held from 11-13 October, 2023.

Dr. R. K. Jenamani, Sc-G, was nominated by the Govt of India for foreign deputation as expert and resource person to Oman to deliver lectures at Second WMO Session on the WMO PTC/GCC Workshop on Impact-based Forecast and Warning Services (IBFWS). It was jointly organized by the WMO Panel on Tropical Cyclones and hosted by Director General of Meteorology at CAA, Sultanate of Oman at Muscat, during 5-9 November, 2023.

Dr. V. K. Soni, Sc-F, **Dr. D. R. Pattanaik**, Sc-F, **Dr. O. P. Sreejith**, Sc-F were on deputation to attend Scoping TPRCC Workshop held at UNESCAP Bangkok, Thailand during 7-10 November, 2023.

Shri Akhil Srivastava, Sc-D was on deputation to attend the Introductory Workshop, Harvard Mittal Institute USA, during 13-16 November, 2023.

Dr. Satyaban B. Ratna, Sc-E was on deputation to attend the Introductory Workshop, Shefayim, Israel, during 19-24 November, 2023.

Dr. Ashok Kumar Das, Sc-E was on deputation to attend 2nd face-to-face meeting of RA II CP-Hydrology in Bangkok, Thailand during 27-29 November, 2023.

Dr. K. S. Hosalikar, Sc-G was on deputation to attend WIGOS Implementation Workshop for the WMO RA II Members to be held at Beijing, China from 27-30 November, 2023.

Ms. Neetha K Gopal, Sc- F, Ms. Monica Sharma, Sc-D and Dr. T. Balakrishnan, INCOIS were on deputation, WMO RA II Technical Workshop on Marine and Coastal Services, Tokyo, Japan, 4-7 December, 2023.

Shri V. R. Durai, Sc-F was on deputation to WMO VCP Workshop on Recent Advances of Severe Weather Forecasting Techniques using Machine Learning, Hong Kong Observatory, from 4-8 December, 2023.

Dr. Satya Prakash, Sc-D was on deputation to WMO Core Satellite Data Workshop 5-7 December, 2023 at Geneva.

Dr. Suman Gurjar, Sc-D, Shri Anshul Chauhan, Sc-C were on deputation to APDIM Regional Expert Group Meeting, Dushanbe, the Republic of Tajikistan, 7-8 December, 2023.

Dr. Ananda Kumar Das, Sc-F was on deputation to WMO Tropical Cyclone Advisory Group Meeting at Geneva 7-8 December, 2023.



सत्यमेव जयते

ACHIEVEMENTS / APPRECIATIONS / AWARDS RECEIVED

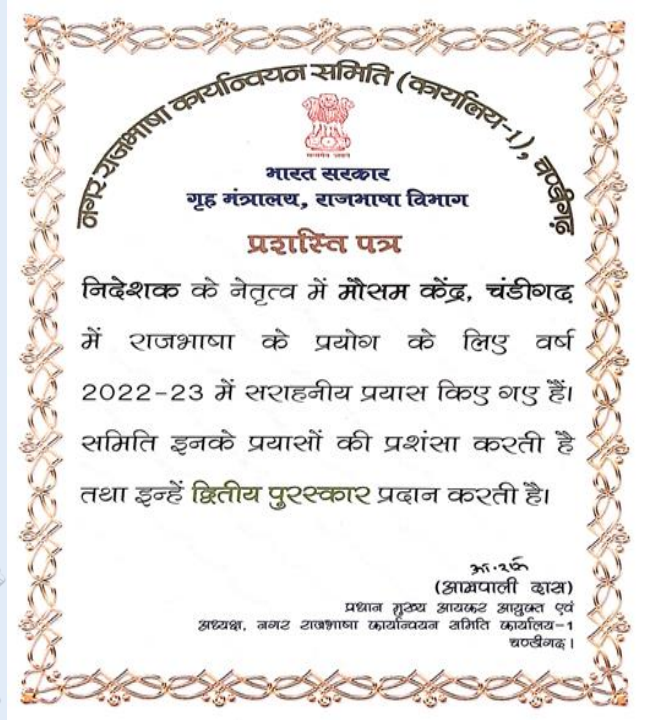
पुरस्कार / सम्मान

नगर राजभाषा कार्यान्वयन समिति (का.-2), पुणे द्वारा वर्ष 2022-2023 के लिए दिनांक 29.11.2023 को जलवायु अनुसंधान एवं सेवाएँ कार्यालय, पुणे का राजभाषा संबंधी निरीक्षण किया गया। प्रमुख, जलवायु अनुसंधान एवं सेवाएँ कार्यालय, पुणे को उत्कृष्ट राजभाषा कार्यान्वयन हेतु प्रथम पुरस्कार प्रदान किया गया। पुरस्कार वितरण दिनांक 05.12.2023 को एनसीएल, पाषाण, पुणे में आयोजित नराकास (का.-2) की छमाही बैठक में हुआ।



प्रमुख, जलवायु अनुसंधान एवं सेवाएँ कार्यालय, पुणे को उत्कृष्ट राजभाषा कार्यान्वयन हेतु प्रथम पुरस्कार प्रदान किया गया

नगर राजभाषा कार्यान्वयन समिति (का.-1), चंडीगढ़ द्वारा वर्ष 2022-2023 के लिए मौसम केंद्र-चंडीगढ़ को उत्कृष्ट राजभाषा कार्यान्वयन हेतु द्वितीय पुरस्कार प्रदान किया गया।



Appreciation was received from D.I.G. of Indian Coastguard for the relentless efforts of team of **M.C. Ahmedabad** for installation of AWS at ICGAS Daman.

Infrastructure Development & Installations

NEW PROJECTS/SCHEMES INITIATED

A new **Surface Ozone Recording Instrument** was installed at MC Shillong and Ranichuri. On December 16.12.2023, the touring officials conducted a field demonstration and training on how to maintain the instruments and share the collected data for staff of MC Shillong.



A new surface ozone instrument was installed at M.C. Shillong by touring officials from CRS Pune

Shri Thangjalal Lhouvum, Sc-D visited the Head, Central Potato Research Institute (ICAR)-Regional Station Shillong on 4th October, 2023 for AWS site and for future collaboration in farmers' interest.



Shri Thangjalal Lhouvum, Sc-D & Head, M.C. Shillong and staff

PWD systems were installed at HAL airport, Bengaluru (RWY 27) during 26.10.2023 to 29.10.2023 and at Mysore airport (RWY 09).

PWD systems were installed at Kannur airport (RWYs 25 & 07) by M.C. Thiruvananthapuram in October, 2023 with technical guidance from SID.

PWD systems were installed at Mangalore airport during 23.11.2023 to 30.11.2023.

Agro-Observatory at Chhindwara has been installed in the month of November 2023.

राजभाषा अनुभाग

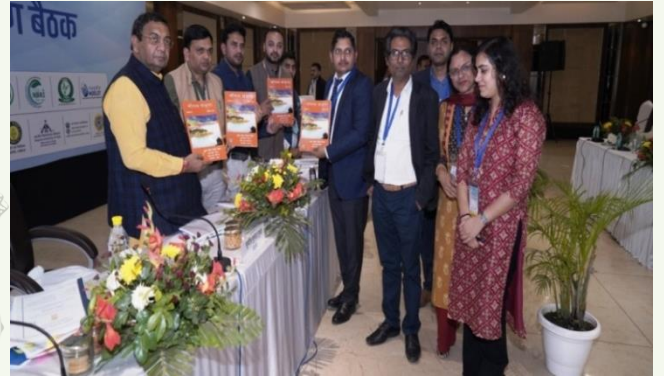
राजभाषायी निरीक्षण

माननीय संसदीय राजभाषा समिति की दूसरी उपसमिति द्वारा दिनांक 03.10.2023 को मौसम केंद्र-शिमला का धर्मशाला में निरीक्षण किया गया। इस निरीक्षण में मौसम केंद्र-शिमला के कार्यालय प्रमुख श्री सुरेंद्र पॉल, वैज्ञानिक 'एफ' ने भाग लिया। यह निरीक्षण समिति की सह संयोजक महोदया श्रीमती रंजनबेन भट्ट जी की अध्यक्षता में हुआ। निरीक्षण सफल एवं संतोषजनक रहा।



राजभाषा समिति की दूसरी उपसमिति द्वारा मौसम केंद्र-शिमला का धर्मशाला में निरीक्षण किया गया

माननीय संसदीय राजभाषा समिति की दूसरी उपसमिति द्वारा दिनांक 30.11.2023 को मौसम कार्यालय-वाराणसी का वाराणसी में निरीक्षण किया गया। इस निरीक्षण में मौसम कार्यालय- वाराणसी के कार्यालय प्रमुख श्री मनीष राय, वैज्ञानिक 'डी' ने भाग लिया। यह निरीक्षण समिति की संयोजक महोदया डॉ. रीता बहुगुणा जोशी जी की अध्यक्षता में हुआ। निरीक्षण सफल एवं संतोषजनक रहा।



राजभाषा समिति की दूसरी उपसमिति द्वारा को मौसम कार्यालय-वाराणसी का निरीक्षण किया गया

माननीय संसदीय राजभाषा समिति की दूसरी उपसमिति द्वारा दिनांक 27.12. को खगोल विज्ञान 2023 केंद्र-कोलकाता का कोलकाता में निरीक्षण किया गया। इस निरीक्षण में मंत्रालय से श्री सेंथिल पांडियन, संयुक्त सचिव और श्रीमती विमला दहिया, सहायक निदेशक लय से श्री विवेक तथा मुख्या (राजभाषा) सिन्हा, वैज्ञानिक 'जी' और श्रीमती सरिता जोशी उपनिदेशक ने भाग (.भा.रा) लिया। यह निरीक्षण समिति की संयोजक महोदया डॉ. रीता बहुगुणा जोशी जी की अध्यक्षता में हुआ। निरीक्षण सफल एवं संतोषजनक रहा।



राजभाषा समिति की दूसरी उपसमिति द्वारा को खगोल विज्ञान केंद्र-कोलकाता का निरीक्षण किया गया

बैठकें

विज्ञान और प्रौद्योगिकी मंत्रालय तथा पृथ्वी विज्ञान मंत्रालय की संयुक्त हिंदी सलाहकार समिति की 34वीं बैठक दिनांक 15.12.2023 (शुक्रवार) को आर्यभट्ट सभागार, न्यू बिल्डिंग

ब्लॉक-1, टेक्नोलॉजी भवन, नई दिल्ली में आयोजित की गई। इस बैठक में श्रीमती रंजू मदान, उपमहानिदेशक (प्रशासन) वैज्ञानिक 'जी' ने भाग लिया। उपनिदेशक (रा.भा.) श्रीमती सरिता जोशी और वरिष्ठ अनुवाद अधिकारी श्री बीरेन्द्र कुमार भी इस बैठक में उपस्थित रहे।

Research & Publications

Twenty five (25) research articles have been published in MAUSAM (Vol. 74, No. 4), October, 2023 issue.

Following are the research articles published in MAUSAM authored by IMD Officials:

Aashna Verma, Akash Vishwakarma, **Sanjay Bist**, Sushil Kumar and R. Bhatla, 2023, "A long-term drought assessment over India using CMIP6 framework : present and future perspectives", *MAUSAM*, 74, 4, 963-972. <https://doi.org/10.54302/mausam.v74i4.6198>.

Dr. A. Sravani, Dr. K. Naga Ratna, R. Sudheer Kumar and N. Rekha, 2023, "Quantitative precipitation forecast for the Godavari basin using the synoptic analogue method" *MAUSAM*, 74, 4, 1043-1052. <https://doi.org/10.54302/mausam.v74i4.5267>.

Chetana Patil, Somenath Dutta, G. K. Sawaisarje and Pooja Yadav, 2023, "A study on some dynamical aspects of Uttarakhand heavy rainfall events", *MAUSAM*, 74, 4, 1073-1080. <https://doi.org/10.54302/mausam.v74i4.5379>.

C. S. Tomar, Rajiv Bhatla, V. K. Soni and R. K. Giri, 2023, "Convective weather event monitoring with multispectral image analysis of INSAT-3D/3DR over Indian domain", *MAUSAM*, 74, 4, 1113-1130. <https://doi.org/10.54302/mausam.v74i4.6176>.

Babita Dani, Vaibhava Srivastava, A. P. Singh and R. Bhatla, 2023, "Numerical Modelling of tsunami wave to assess the possible impacts along western coasts of India", *MAUSAM*, 74, 4, 1131-1140. <https://doi.org/10.54302/mausam.v74i4.6028>.

J. P. Gupta, A. H. Warsi and Pradeep Sharma, "Severe dust storm/thunderstorm activity over Uttar Pradesh on 13th May, 2018 - A case study, 2023", *MAUSAM*, 74, 4, 1141-1154. <https://doi.org/10.54302/mausam.v74i4.6404>.

Pushpendra Johari, Sushil Kumar, Sujata Pattanayak, Dipak Kumar Sahu and A Routray, 2023, "Performance of land surface schemes on simulation of land falling tropical cyclones over Bay of Bengal using ARW model", *MAUSAM*, 74, 4, 1155-1172. <https://doi.org/10.54302/mausam.v74i4.5861>.

Research articles published in other international journals authored by IMD Officials during October-December, 2023.

Bondyopadhyay, Sourish; Mohapatra, M., "Suitable thermodynamic indices for the prediction of thunderstorm events for different cities throughout India", *OCT*, 135, 5, DOI:10.1007/s00703-023-00984-z.

Srivastava, Akhil; Mohapatra, M.; Das, Ananda K.; Nadimpalli, Raghu; Dwivedi, Suneet, "A new approach to generate dynamical cone of uncertainty for cyclone track forecast over North Indian Ocean", 2023 DEC 7. DOI:10.1007/s11069-023-06339-6.

Shankar, Anand; Sahana, Bikash Chandra, "Efficient prediction of runway visual range by using a hybrid CNN-LSTM network architecture for aviation services", 2023 NOV 30. DOI:10.1007/s00704-023-04751-3.

Madhulatha, A.; Dudhia, Jimmy; Park, Rae-Seol; Bhan, Subhash Chander; Mohapatra, Mrutyunjay, "Effect of Single and Double Moment Microphysics Schemes and Change in Cloud Condensation Nuclei, Latent Heating Rate Structure Associated with Severe Convective System over Korean Peninsula", NOV, 14, 11, DOI:10.3390/atmos14111680.

Beasley, Parker; Misra, Vasubandhu; Jayasankar, C. B.; Bhardwaj, Amit, "Heat waves in Florida and their future from high-resolution regional climate model integrations", 2023 OCT 19. DOI:10.1002/joc.8278.

Mohanty, Shyama; Nadimpalli, Raghu; Mohanty, U. C.; Pattanayak, Sujata, "Storm surge prediction improvement using high resolution meso-scale model products over the Bay of Bengal", 2023 OCT 19. DOI:10.1007/s11069-023-06160-1.

Bhowmick, Mansi; Sahany, Sandeep; Das, Ananda Kumar, "Recent changes in the climatological characteristics of daily contiguous rain areas over India", NOV 4, 6, 1, DOI:10.1038/s41612-023-00464-6.

Baral, Rakesh; Mohanty, Pratap Kumar; Pradhan, Subhasis; Rajawat, Ajay Singh; Samal, Rabindro Nath; Das, Umasankar, "Natural opening of a new inlet in Chilika Lagoon: A cause and impact analysis", DEC 30, 68, DOI:10.1016/j.risma.2023.103248.

Boyaj, Alugula; Nadimpalli, Raghu; Reddy, Dpranay; Sinha, P.; Karrevula, N. R.; Osuri, Krishna K.; Srivastava, Akhil; Swain, Madhusmita; Mohanty, U. C.; Islam,

Sahidul; Kaginalkar, Akshara, "Role of radiation and canopy model in predicting heat waves using WRF over the city of Bhubaneswar, Odisha", DEC, 135, 6, DOI:10.1007/s00703-023-00994-x.

Kumar, Nishant; Nair, Anjali S.; Soni, Kirti; Shingare, A. A.; Motghare, Vidyanand M.; Rajput, Karansingh A.; Soni, V. K.; Kumar, Anikender; Jha, Arvind Kumar, "Characteristics of atmospheric boundary layer structure using monostatic SODAR system over Mumbai region", NOV 1, 132, 4, DOI:10.1007/s12040-023-02191-1.

Pande, Chaitanya B.; Moharir, Kanak N.; Varade, Abhay M.; Abdo, Hazam Ghassan; Mulla, S.; Yaseen, Zaher Mundher, "Intertwined impacts of urbanization and land cover change on urban climate and agriculture in Aurangabad city (MS), India using google earth engine platform", OCT 10, 422, DOI:10.1016/j.jclepro.2023.138541.

Patel, Pratiman; Ankur, Kumar; Jamshidi, Sajad; Tiwari, Alka; Nadimpalli, Raghu; Busireddy, N. K. R.; Safae, Samira; Osuri, Krishna K.; Karmakar, Subhankar; Ghosh, Subimal; Aliaga, Daniel; Smith, James; Marks, Frank; Yang, Zong-Liang; Niyogi, Dev, "Impact of Urban Representation on Simulation of Hurricane Rainfall", NOV 16, 50, 21, DOI:10.1029/2023GL104078.

Climate Diagnostic Bulletin for October and Monsoon Season 2023 has been published and uploaded on the website.

ENSO bulletin for the month of December 2023 and Seasonal Climate Outlook for South Asia for the period of December to March 2024 were issued. (QuickLink:https://imdpune.gov.in/cmpg/Product/ENSO_Bulletin/ENSO_IOD_Update_Bulletin_12_23.pdf.)

Climate Summary for the month of November 2023 Issued.

Climate Diagnostic Bulletin for August and September 2023 has been published and uploaded on the website.

Prakash, S. and M. Mohapatra, 2023, "Mean rainfall characteristics of tropical cyclones over the North Indian Ocean using a merged satellite-gauge daily rainfall dataset" *Natural Hazards*, <https://doi.org/10.1007/s11069-023-06158-9>.

R. K. Giri, Satya Prakash, R. Yadav, and K. C. Saikrishnan, 2023, "INSAT geostationary meteorological satellite program and current meteorological data processing

system for INSAT-3D/3DR/3DS at India Meteorological Department" *Vayumandal*, 49(1), 11-28.

Outreach and Media Interaction

IMD released Long Range Forecast of rainfall and temperature for the month of November 2023 on 31st October. **Dr. M. Mohapatra**, DG IMD made a presentation in this regard and addressed the Press and electronic media through the online conference. Media team countrywide participated in the press conference. The detailed Press Release issued in this regard is available at the link: https://internal.imd.gov.in/press_release/20231031_pr_2608.pdf.

The Press Meet is available at link: <https://fb.watch/o0HM42XBlv/?mibextid=RUBz1f>.

Dr. M Mohapatra, DG IMD participated as an Invited Speaker at the International Solar Energy Society (ISES) Solar World Congress 2023 at Ashok Hotel, New Delhi on 3rd November, 2023.

Farmers' Awareness Programme (FAPs): FAPs organized at 817 locations so far by November, 2023 by Agromet Field Units (AMFUs) and District Agromet Unit (DAMUs).

VISITORS

Students from Dr. B.K.B. College, P.O.: Puranigudam, Nagaon (Assam) visited Regional Meteorological Centre, Guwahati 3th October, 2023.



Students from Dr. B.K.B. College, P.O.: Puranigudam, Nagaon (Assam)

Twenty two Students and one teacher from Agriculture Deptt., William Carey University Shillong visited the MC Shillong on 9th October, 2023. The students were shown the surface and automatic observation stations along with briefing them about IMD activities, MC Shillong website and how to access and visualize AWS data at various sites.



Students and one teacher from Agriculture Deptt., William Carey University Shillong visited M.C. Shillong

Nineteen (19) Students and Four (4) teachers visited MC Shillong from Kristein Johnson Science Club, Ferrado Shelter Home on 2nd November, 2023. The students were shown the surface and automatic observation stations along with briefing them about IMD activities, M.C. Shillong website and how to access and visualize AWS data at various sites.



Students and Four (4) teachers visited MC Shillong from Kristein Johnson Science Club, Ferrado Shelter Home

Around 60 students of Class 9th and 10th accompanied with 2 Teachers ORCHIDS, The International School, Nagpur visited on 02nd November, 2023.



Students and Teacher ORCHIDS, The International School, Nagpur

Students from (i) Nowgong College (Autonomous), Nowgaon, Assam and (ii) Arunoday University, Naharlagun, Itanagar, Arunachal Pradesh visited Regional Meteorological Centre, Guwahati on 6th November, 2023.



Students from (i) Nowgong College (Autonomous), Nowgaon (ii) Arunoday University, Naharlagun, Itanagar

Anand Agriculture University के 100 छात्रों ने दिनांक: 21-22 November, 2023 को कार्यालय का शैक्षणिक दौरा किया।



Student of Anand Agriculture University

Gp. Cpt. Vinila Verma, Command Met. Officer HQ EAC, IAF Shillong visited M.C. Shillong on 30th November, 2023. She was briefed about IMD activities by Head M.C. Shillong. The visit and discussions were fruitful for future collaboration between IMD and EAC Command Met.



Gp. Cpt. Vinila Verma, Command Met. Officer HQ EAC, IAF Shillong visited MC Shillong

CEE (Centre for Environmental Education) के माध्यम से Rachna स्कूल के 100 छात्रों ने दिनांक: 01st December, 2023 को M.C. Ahmadabad का शैक्षणिक दौरा किया।



Rachna स्कूल के 100 छात्रों ने MC Ahmadabad का शैक्षणिक दौरा किया।

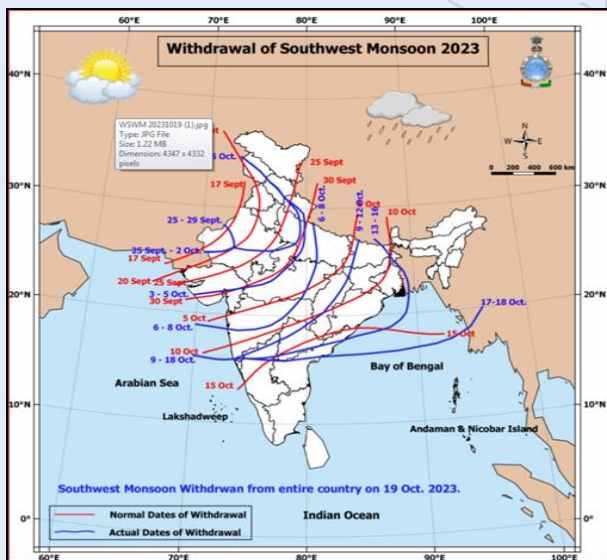
Visit of H. E. Robert Maxian, Ambassador of the Slovak Republic to India alongwith Mr. Patrik Liska, Trade Commissioner, Embassy of the Slovak Republic, Mr. Jozef Omelka, Director of Microstep-MIS, Mr. Madhav Rao, Country Manager of Microstep-MIS and Mr. Milind Dande, Manager for Business Development of Microstep-MIS to India Meteorological Department on 6th December, 2023.

Significant Weather Features

Southwest monsoon : SW Monsoon withdrew from entire country on 19th October, 2023 against the normal date of 15th October and commencement of Northeast Monsoon over South Peninsula on 21st October against the normal of 20th October:

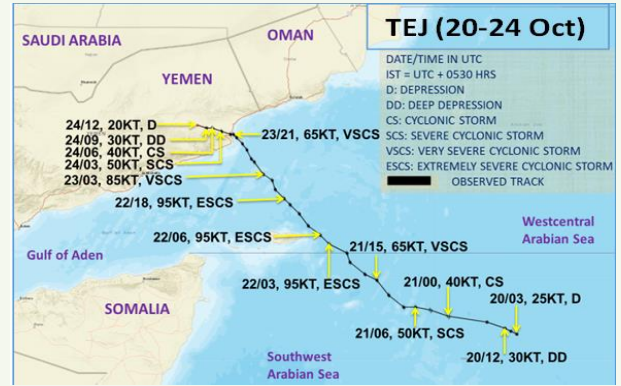
It occurred in association with strengthening of northeasterlies in the region.

Scattered to fairly widespread rainfall over south TN and Kerala.



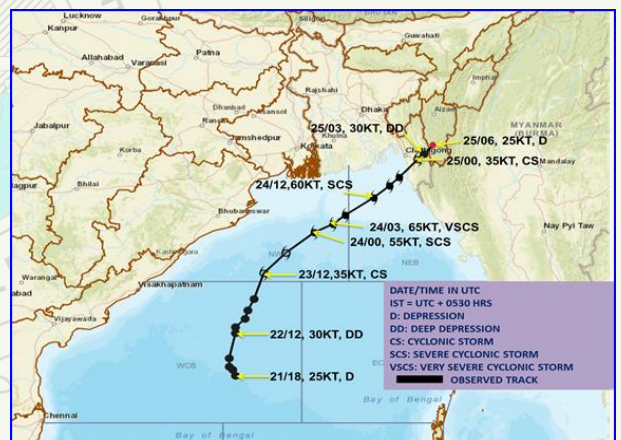
Withdrawal of Southwest Monsoon, 2023

Extremely Severe Cyclonic Storm "TEJ" during 18-24 Oct 2023 over Arabian Sea : Development of a Low pressure area over southeast and adjoining eastcentral which later intensified into cyclone Extremely Severe Cyclonic Storm (ESCS), "Tej" during 18-24 October 2023 over Arabian Sea.



Observed Track of "TEJ" over Arabian Sea during 20-24 October, 2023.

Very Severe Cyclonic Storm "Hphoon" during 19-25 Oct 2023 over Bay of Bengal: Development of a Low pressure area over southwest bay of Bengal which later intensified into cyclone Very Severe Cyclonic Storm ((VSCS), "Hphoon" during 19-25 October, 2023 over Bay of Bengal.

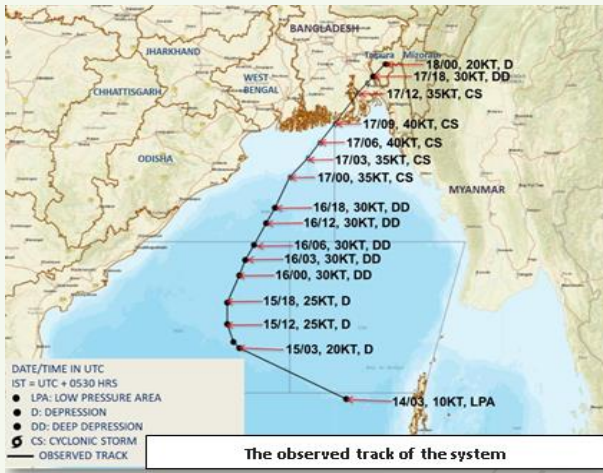


Observed track of Very Severe Cyclonic Storm "HAMOON" over Bay of Bengal during 21st - 25th October, 2023

Low Pressure Systems : During the month of the November 2023, a total of three Low pressure system (LPS) formed over Indian region (one over Arabian Sea and two over Bay of Bengal), out of which two systems intensified into Cyclonic Storm and above. The 1st system was formed as a low Pressure System over southeast Arabian Sea which then was moved towards southwest Arabian Sea during 8-12 Nov and became less marked thereafter. But other two systems were emerged from east to Andaman Sea. The 2nd system was observed as a cyclonic circulation over South Andaman Sea on 13th November. It intensified in to **Cyclonic Storm "Midhili" over Bay of Bengal** and moved during 14-19 November,

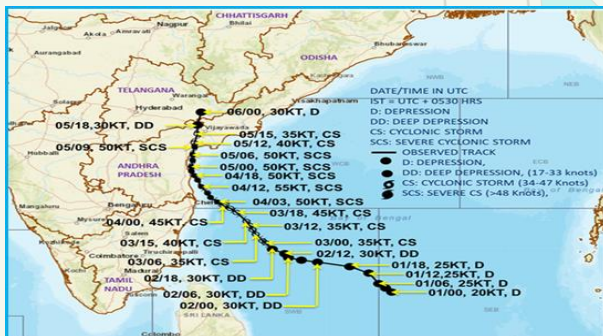
2023, and crossed Bangladesh coast near Khepupara during 1430-1530 hours IST of 17th November, 2023. 3rd System was also observed as a Cyclonic Circulation and lay over South Andaman Sea & adjoining south Thailand on 26th November, 2023 and then concentrated into a Depression over Southeast & adjoining Southwest Bay of Bengal on 1st December, 2023. It intensified into a Cyclonic Storm "MICHAUNG" (pronounced as MIGJAUM) over the same region on 3rd December, 2023.

Cyclonic Storm "MIDHILI" over the Bay of Bengal (15th - 18th November, 2023):



The Observed track of the Cyclonic Storm "MIDHILI" over the Bay of Bengal (15th - 18th November, 2023)

Severe Cyclonic Storm "MICHAUNG" over the Bay of Bengal (1st - 6th December, 2023) :



The observed track of the Severe Cyclonic Storm "MICHAUNG" over the Bay of Bengal (1st - 6th December, 2023)

Average Temperature during November-2023

The mean temperature for the month of November 2023 for the country as a whole was 24.35 °C which was above normal by +1.13 °C. The normal temperature for the month is 23.22 °C, which was highest since 1901.

The highest maximum temperature of 38.5 °C had been recorded at Bhuj (Saurashtra & Kutch) on 2nd November 2023 and the lowest minimum temperature of 7.0 °C had been recorded at Sikar (East Rajasthan) on 23rd November, 2023 over the plains of the country during the month.

Average Temperature during December-2023

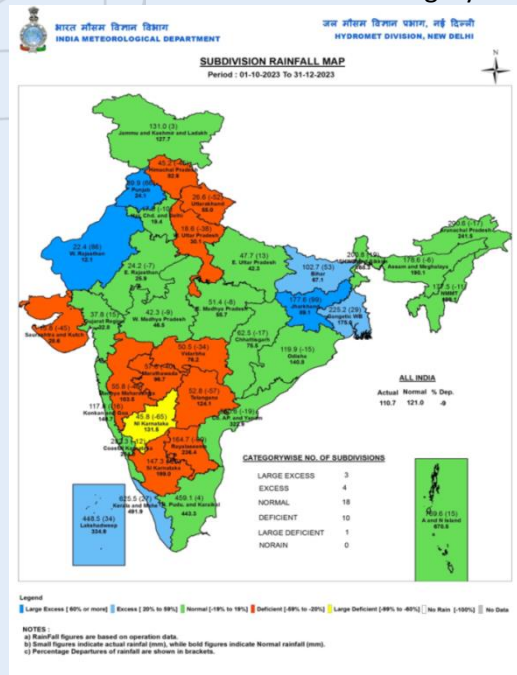
The mean temperature for the month of December-2023 for the country as a whole was 21.6 °C which was above normal by +1.11 °C. The normal temperature for the month is 20.49 °C which was highest since 1901.

In December 2023, the average maximum temperature over the country was 7th highest (27.04 °C with an anomaly of 0.51 °C) since 1901. The average minimum temperature was highest at 16.16 °C since 1901 against the earlier record of 15.69 °C in 2008. The mean temperature was highest at 21.60 °C since 1901 against the earlier record of 21.49 °C in 2022.

The highest maximum temperature of 37.2 °C had been recorded at Kannur (Kerala & Mahe) on 30th December, 2023 and the lowest minimum temperature of 2.8 °C had been recorded at Ludhiana (Punjab) 21st December, 2023 and Sikar (East Rajasthan) on 22nd December, 2023 over the plains of the country during the month.

The annual mean land surface air temperature averaged over India during 2023 was +0.68 °C above the long-term average (1981-2010 period). The year 2023 was the 2nd warmest year on record since nationwide records commenced in 1901. However, this was lower than the highest warming observed over India during 2016 (anomaly of +0.71 °C).

Met Sub-division-wise categorized rainfall, out of 36 Met Sub-divisions, 07 Met sub-divisions in LARGE EXCESS, 13 Met sub-divisions in EXCESS, 04 Met sub-divisions in NORMAL, 6 in DEFICIENT, 6 in LARGE DEFICIENT and none of any Met sub-divisions in "NO RAIN" category of rainfall.



SUBDIVISION-WISE RAINFALL: Period 01-10-2023 To 31-12-2023