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IMPORTANT EVENTS

Celebration of 76th Independence Day, 2022

Dr. Jitendra Singh Hon'ble Minister of State (Independent Charge) for the Ministry of Science and Technology and Ministry of Earth Sciences, Minister of State for Prime Minister's Office; Ministry of Personnel, Public Grievances and Pensions; Department of Atomic Energy and Department of Space, **Dr. M. Ravichandran**, Secretary, Ministry of Earth Sciences, **Dr. Rajesh S. Gokhale**, Secretary, Department of Biotechnology, **Dr. Srivari Chandrasekhar**, Secretary, Department of Science & Technology, **Dr. N. Kalaiselvi**, Secretary, Department of Scientific & Industrial Research & DG CSIR visited IMD on 15th August, 2022. **Dr. M. Mohapatra**, DG, IMD welcomed Hon'ble Minister, Secretaries and Officials from MoES, DBT, DST, DSIR, IMD and NCMRWF, School children and media and highlighted the significant activities of IMD. Hon'ble Minister hoisted the **National Flag** on the auspicious occasion of **76th Independence Day** at IMD premises and addressed the gathering.



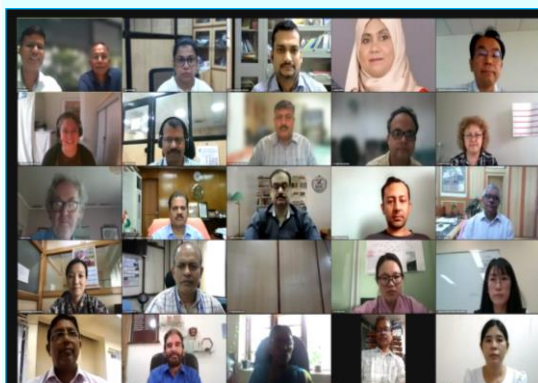
Dr. Jitendra Singh, Hon'ble Minister hoisting the National Flag



Participants in 76th Independence Day event in IMD

South Asian Climate Outlook Forum (SASCOF-23)

Twenty-third Session of **South Asian Climate Outlook Forum (SASCOF-23)** and **Climate Services User Forum (CSUF)** were held during 26-29 September, 2022. The aim of the workshop was to prepare the Consensus Outlook for OND 2022 Season. The Climate Services User Forum (CSUF) which was conducted on the 29th was aimed to understand the Interpretation of the Consensus Outlook for OND 2022 and study the Application/New Products for Climate Service for South Asia.



SASCOF 23 and CSUF - Online Session

Second South Asia Hydromet Forum (SAHF) Executive Council Meeting

Dr. M. Mohapatra, DG, IMD attended the "Second South Asia Hydromet Forum (SAHF) Executive Council Meeting" from 19-20 September, 2022 held in Bangkok, Thailand to review progress, agree on strategies and actions identified in the SAHF Regional Approach, establish a mechanism to sustain SAHF beyond the current phase and decide on the way forward. The SAHF EC is constituted by DG/Directors of NMHSs as a managerial council that develops strategic plans for the implementation of the SAHF.



Dr. M. Mohapatra, DG, IMD during "Second South Asia Hydromet Forum (SAHF) Executive Council Meeting"

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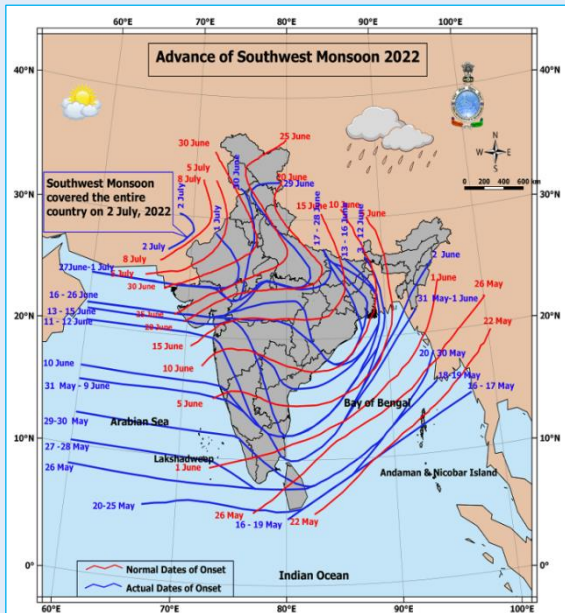


Significant Weather Features

Salient features of month July, 2022

Advance of Southwest Monsoon:

Southwest Monsoon has further advanced into entire Punjab, Haryana and Chandigarh and some more parts of Rajasthan on 1st July, 2022 remaining parts of North Arabian Sea, Gujarat and Rajasthan states on 2nd July and thus, has covered the entire country on 2nd against the normal date of 8th July; 6 days ahead of the normal date of monsoon coverage for entire India.



Advance of Northern Limit of Monsoon (NLM) 2022

Rainfall Scenario

The rainfall for the country has been recorded as 327.7 mm which is 117% of its Long Period Average (LPA) of 280.5 mm. In the month 10 Met sub-divisions wise in LARGE EXCESS, 09 Met sub-divisions in EXCESS, 08 Met sub-divisions in NORMAL, 08 in DEFICIENT and 01 in LARGE DEFICIENT while no Met. sub-divisions remained in "NO RAIN" category of rainfall.

Low Pressure Systems

(i) The first system (4-8 July) formed over north Odisha & adjoining south Jharkhand and Gangetic West Bengal on 4th July, 2022 and it moved west-northwestwards towards South Pakistan across central parts of Madhya Pradesh, Saurashtra & Kutch & adjoining NE Arabian Sea (AS) during its life period.

(ii) The second system (9-18 July) formed over south coastal Odisha & neighbourhood on 9th July, attained and maintained the intensity of a Well Marked Low Pressure Area during 12-14 July, then moved west-northwestwards during 17- 18 July 2022 towards NE Vidarbha.

(iii) The third system (15-18 July) formed over Northeast Arabian Sea & adjoining Saurashtra & Kutch in the early morning hours of 15th July 2022, concentrated into a Depression on 16th July morning over Northeast AS off Gujarat coast and weakened into a Low pressure area on 18th morning and then became less marked by the evening of the same day.

(iv) The fourth system (24-27 July) formed over southwest Rajasthan & neighbourhood on 24th July and moving south-westwards, it emerged into North Arabian Sea on 26th and moved away westwards on 27th;

The total number of LPS days in July 2022 had been 21 days against the normal of about 13.5 days for the month.

Temperature Scenario

a) The mean temperature for the month was 28.17°C which was above normal (27.98°C); by +0.19°C.

b) The highest maximum temperature of 41.8°C had been recorded at Ganganagar (West Rajasthan) on 8th July 2022 and the lowest minimum temperature of 16.4°C at Khargone (West Madhya Pradesh) on 19th July 2022.

Salient Features of month of August, 2022

Rainfall Scenario

The rainfall for the country has been recorded as 263.7 mm which is 103% of its Long Period Average (LPA) of 254.9 mm. In the month, 04 Met sub-division wise in LARGE EXCESS, 08 Met sub-divisions in EXCESS, 14 Met sub-divisions in NORMAL, 09 in DEFICIENT and 01 in LARGE DEFICIENT and no any Met. Sub-division remained in "NO RAIN" category of rainfall.

Low Pressure Area

Four Low pressure areas developed over Bay of Bengal during the month and moved west-north-westward direction. There had been 19 Low pressure system days during the month against the normal of 16.3 days; the system had caused fairly widespread to widespread rainfall activity on many days over Central as well as Peninsular India and over Rajasthan along with very heavy and extremely heavy rainfall on a few days and caused strengthening of the monsoon flow over Arabian Sea and widespread rainfall along with very heavy and extremely heavy rainfall activity over Peninsular India especially along the west coast during the month.

(i) Depression over coastal Odisha (9-10 August)

A low pressure area was formed over northwest Bay of Bengal off Odisha-West Bengal coasts in the evening of 6th August, 2022. It lay as a well-marked low pressure area (WML) over northwest & adjoining westcentral BoB off south Odisha & adjoining north Andhra Pradesh coasts in the forenoon of 7th August, 2022. It moved west-northwestwards and weakened into a WML in the morning of 10th August, 2022, over Chhattisgarh and adjoining east Madhya Pradesh.

(ii) Depression over northeast Arabian Sea (12-13 August)

A low pressure area was formed over Saurashtra and adjoining northeast Arabian Sea (AS) in the forenoon of 10th August, 2022. It lay as a well-marked low pressure area over Saurashtra & adjoining northeast AS in the evening of 10th August, 2022. It moved nearly westwards till forenoon of 16th August and thereafter moving slightly north-westwards, it recurred east-northeastwards and weakened into a WML in the evening of 13th August, 2022, over the northeast & adjoining northwest AS.

(iii) Depression over northwest Bay of Bengal (14–16 August)

A low pressure area was formed over North BoB in the forenoon of 13th August, 2022. It lay as a WML over northwest BoB off North Odisha and West Bengal coasts in the evening of 13th August, 2022. It concentrated into a depression over northwest BoB and adjoining coastal areas of West Bengal & North Odisha in the forenoon of the 14th August, 2022 about 10 km southeast of Digha (West Bengal). It moved west-northwestwards across South Jharkhand, North Interior Odisha, Chhattisgarh, Madhya Pradesh and East Rajasthan during 14-16 August and weakened into a WML over central parts of Rajasthan in the evening.

(iv) Depression over northwest & adjoining northeast BoB during 19-23 August

A low pressure area was formed over northeast and adjoining areas of eastcentral BoB in the morning of 18th August. It concentrated into a depression over northwest & adjoining northeast Bay of Bengal in the morning of 19th It moved across coastal areas of West Bengal, north Odisha, south Jharkhand, north Chhattisgarh, Madhya Pradesh, Southeast Uttar Pradesh and weakened into a Depression over Northwest Chhattisgarh and adjoining Northeast Madhya Pradesh & Southeast Uttar Pradesh in the morning of 21st August, 2022. It weakened into a WML over East Rajasthan and adjoining Northwest Madhya Pradesh in the morning (0830 hours IST) of 23rd August, 2022.

Temperature Scenario

- The mean temperature for the month was 27.94°C which was above normal (27.55 °C) by +0.39°C.
- The highest maximum temperature of 39.4°C had been recorded at Churu (West Rajasthan) on 30th August, 2022 and the lowest minimum temperature of 17.6°C had been recorded at Tiruppattur (Tamil Nadu) on 28th August, 2022 over the plains of the country during the month.

Salient Features of month September, 2022

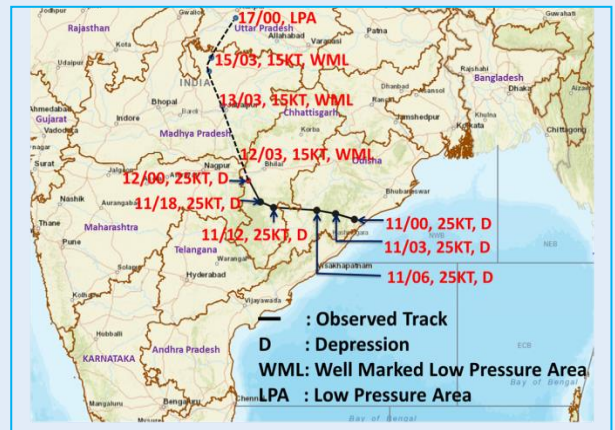
Rainfall Scenario

The rainfall for the month was recorded as 181.3 mm which is 108% of its Long Period Average (LPA) of 167.9 mm. In the month, 03 Met sub-divisions in LARGE EXCESS, 12 Met sub-divisions in EXCESS, 17 Met sub-divisions in NORMAL, 04 in DEFICIENT and no any Met. Sub-divisions remained in LARGE DEFICIENT, "NO RAIN" category of rainfall.

Depression over south coastal Odisha during 11-12 September

A low pressure area was formed over westcentral and adjoining eastcentral BoB in the forenoon of 8th September, 2022. It lay as a well marked low pressure area over northwest BoB off North Andhra Pradesh-South Odisha coasts in the forenoon (0300 UTC/0830 hrs IST) of 10th September. Under favourable conditions, it concentrated into a Depression in the morning (0000 UTC/0530 hrs IST) of 11th September 2022 over south coastal Odisha and neighbourhood about 20 km northwest of Gopalpur. Thereafter, it moved north-northwestwards and weakened into a well marked low pressure area over southeast Madhya Pradesh and neighbourhood in the forenoon (0300 UTC/0830 hrs IST) of 12th September. It maintained its intensity of well marked low pressure area and moved north-

northwestwards across Madhya Pradesh till forenoon (0300 UTC/ 0830 hrs IST) of 15th September. It weakened into a low a low pressure area over central parts of Uttar Pradesh in the morning (0000 UTC/0530 hours IST) of 17th and became less marked over the same region in the same forenoon (0300 UTC/0830 hours IST). The system caused fairly widespread to widespread rainfall activity over Gangetic West Bengal, Odisha, Chhattisgarh, coastal Andhra Pradesh, Bihar, Jharkhand, Madhya Pradesh, Uttar Pradesh and East Rajasthan during its life period.



Observed track of depression

During the month of September 2022, the country as whole received excess rainfall (108% of LPA) mainly over North & Central India especially over Indo-gangetic plains.

In September, three low pressure systems had formed; two systems over the Bay of Bengal and one over the land. Out of these, one system intensified into Depression during 11-12 September 2022 (details already given above). Typhoon activity over Pacific and westward movement of their remnants helped in the formation of Low pressure systems over Bay of Bengal. The low pressure systems and their remnants sustained over the land for longer duration and thus supported the persistent rainfall activity over Northwest and Central India during the month.

Five Western Disturbances had affected Northwest India during the month; interaction of the Western Disturbances with the Low pressure areas and their remnants had caused intense rainfall activity over Northwest India and adjoining areas of Central India; Recurvature of the low pressure systems and their remnants under the influence of passing Western Disturbances had caused frequent spells of rainfall activity over of Uttar Pradesh, Bihar, Jharkhand and Gangetic West Bengal causing reduction in seasonal rainfall deficiency over these areas.

Temperature Scenario

- The mean temperature for the month for the country as a whole was 27.84 °C which was above normal (27.31 °C) by +0.53 °C.
- The highest maximum temperature of 41.6 °C had been recorded at Phalodi (West Rajasthan) on 10th September 2022 and the lowest minimum temperature of 16.6 °C had been recorded at Tiruppattur (Tamil Nadu, Puducherry & Karaikkal) on 1st September, 2022 over the plains of the country during the month.

Salient Features of Monsoon 2022

- The Southwest monsoon seasonal rainfall during June to September for the country as a whole had been above normal [105 -110% of Long Period Average (LPA)].
- Quantitatively, all India monsoon seasonal rainfall during 1 June to 30 September 2022 had been 92.5 cm against the Long Period Average of 87.0 cm based on data of 1971-2020 (106% of its LPA).
- The Southwest monsoon seasonal (June to September) rainfall had been Above Normal over South peninsula (122% of LPA) and Central India (119 % of LPA). Seasonal rainfall had been Normal over Northwest India (101%) and Below Normal over East and Northeast India (82%).
- The southwest monsoon seasonal (June to September) rainfall over the monsoon core zone, which consists of most of the rainfed agriculture regions in the country had been above normal (120% of LPA).
- Out of the total 36 meteorological subdivisions, 12 subdivisions constituting 40% of the total area of the country received excess, 18 subdivisions (43% of the total area) received normal rainfall and 6 subdivisions (17% of the total area) received deficient season rainfall. These 6 Met subdivisions which got deficient rainfall are West Uttar Pradesh, East Uttar Pradesh, Bihar, Jharkhand, Gangetic West Bengal, and Nagaland, Manipur, Mizoram & Tripura (NMMT). Out of these six Subdivisions, majority of them lie in the Gangetic Plains.
- Considering month to month rainfall variation over the country as a whole, the season was very unique with contrasting month to month variation. The rainfall over the country as a whole was 92%, 117%, 104% and 108% of LPA during June, July, August and September respectively.

Verification of Weather Forecast

Region	Period	Forecast (% of LPA)		Actual Rainfall (% of LPA)
		14 th April	31 st May	
All India	Jun to Sep	Normal (96-104% of LPA) 99± 5 of LPA	Normal (96-104% of LPA) 103± 4 of LPA	106
Northwest India	Jun to Sep		Normal (92-108% of LPA)	101
Central India	Jun to Sep		Above Normal (>106% of LPA)	119
Northeast India	Jun to Sep		Normal (96-106% of LPA)	82
South Peninsula	Jun to Sep		Above Normal (>106% of LPA)	122
Monsoon Core Zone	Jun to Sep		Above Normal (>106% of LPA)	120
All India	July (issued on 1 st July)		Normal (94-106% of LPA)	117

All India	August (issued on 1 st August)	Normal (94-106% of LPA)	103
All India	Aug to Sep (issued on 2 nd Aug)	Normal (94-106% of LPA)	105
All India	Sep (issued on 1 st Sep)	Above Normal (>91-109% of LPA)	108

Number of Low-pressure System (LPS) including Low (L), Well Marked Low (WML), Depression (D), Deep Depression (DD), Cyclonic Storm (CS) in monsoon season 2022

Systems / Month	CS	Deep Depression	Depression	Well marked low pressure area	Low pressure area	Total systems
Jun	0	0	0	0	1	1
Jul	0	0	1	2	1	4
Aug	0	1	3	0	0	4
Sep	0	0	1	0	2	3

Long Range forecast of Post-monsoon/NE Monsoon 2022

IMD released long range forecast for the rainfall during Post-monsoon Season 2022 and rainfall and temperature during October, 2022 on 30th September, 2022.

- The Northeast Monsoon Season (October to December (OND)) 2022 rainfall over the south Peninsular India consisting of five meteorological subdivisions (Tamil Nadu, Puducherry & Karaikkal, Coastal Andhra Pradesh & Yanam, Rayalaseema, Kerala & Mahe and South Interior Karnataka) is most likely to be normal (88-112% of Long Period Average (LPA)). Normal to above normal rainfall is likely over most parts of India except some regions of Northwest India and some parts of Northeast India where below normal rainfall is likely.
- During October 2022, normal to above normal rainfall is likely over most parts of India except small pockets of the southernmost region and northern most part of the country. Monthly rainfall over the country as a whole during October 2022 is most likely to be above normal [>115 % of Long Period Average (LPA)].
- During October, normal to below normal maximum temperatures are likely over most parts of the country except many parts of Northeast and Northwest India and some parts of eastern India, where above normal maximum temperatures are likely. Normal to above normal minimum temperatures are likely over most parts of the country except some parts of Northwest India, and southern parts of Peninsular India where below normal minimum temperatures are likely.
- Currently, La Niña conditions are prevailing over the equatorial Pacific region. The latest MMCFS forecast indicates that the La Niña conditions are likely to continue up to end of the year. Other climate models are also indicating continuation of La Niña conditions during the upcoming season. At present the negative IOD conditions are prevailing over the Indian Ocean and the latest MMCFS forecast indicates that the negative IOD conditions are likely to weaken by the end of year.

Significant Events

Celebrations

Hindi Diwas, 2022

IMD celebrated Hindi Diwas at Vrishti Sabhagaar, New Delhi and during the function **Dr. M. Mohapatra**, DG, IMD felicitated the winners of various competitions organized by IMD to promote use of Hindi Language among the employees.

Independence Day, 2022

Dr. Geeta Agnihotri, Sc. 'F' hoisted the National Flag on the occasion of Independence Day, 2022 at MC Bengaluru.



Dr. Geeta Agnihotri after hoisting the National Flag

Dr. S. Bandyopadhyay, Sc. 'F' hoisted National Flag on the 76th Indian Independence Day. A cultural programme had also been organized by RMC Kolkata.



Dr. S. Bandyopadhyay holding miniature of the National flag

On 10th August, 2022, **Dr. S. Bandyopadhyay**, Sc. 'F' delivered a lecture on the occasion of 75 years of India's Independence, celebration of "Azadi ka Amrit Mahotsav" an awareness program on **Weather, Climate and Climate Change**.

The students from schools and colleges had participated in various competitions on Essay writing, Photography, Drawing and Quiz contest organised on the occasion. Prizes were awarded to the participants of the schools and colleges and certificates for the participation were issued.



Dr. S. Bandyopadhyay, Sc. 'F' with the winners of events

MEMORANDUM OF UNDERSTANDING

MOU was signed between IMD and Punjabi University, Patiala, Punjab to **strengthen the future research endeavours at both the organizations** on 8th September, 2022.



Dr. M. Mohapatra, DGM with Vice Chancellor and other Officials of Punjabi University

MOU was signed between IMD and SAIARD, Kolkata for **collaborative research on meteorology** on 22nd September, 2022 at IMD New Delhi.



Signing of MoU between IMD and SAIARD, Kolkata

MOU was signed between IMD and Amity University Gurugram for **cooperation in the area of Climate and Environmental Monitoring and Research** on 19th July, 2022.



Signing of MoU between IMD & Amity University, Gurugram

Human Resource Development Activities

WORKSHOP

Dr. M. Mohapatra, DG, IMD and **Dr. D. R. Pattanaik**, Sc. 'F' participated in the **first Kerala State Climate Change Stakeholders Consultation Workshop (KCCSCW-for Identifying Weather and Climate Information requirements of user Sectors)** during 1-2 August, 2022.

Shri Raja Acharya, Met. 'A' participated in the online workshop **"From Global to Coastal : Cultivating New Solutions and Partnerships for an Enhanced Ocean Observing System in a Decade of Accelerating Change"** during 15-17 August, 2022 organised by the International Centre for Theoretical Physics, Italy (UN/IAEA), GOOS and CLIVAR (WMO).

Dr. Soma Senroy, Sc. 'F' and **Shri Umasankar Das**, Sc. 'C', attended workshop and stakeholders' meeting on **"Lightning-North Odisha Tribal Lightning Resilience Programme-2022"** during 25-26 August, 2022 at Fakir Mohan University (FMU), Balasore, organised jointly by P. G. Department of Geography, FMU and Climate Resilient Observing Systems Promotion Council (CROPC) and India Meteorological Department.

Shri Raja Acharya, Met. 'A' participated in the online **"WMO CAP Implementation"** workshop during 19-20 September, 2022 organized by the WMO, ITU, IFRC and OASIS.

MEETINGS / VIDEO CONFERENCES

Dr. H. R. Biswas, Sc. 'E' attended the **"Crop Weather Watch Group Committee Meeting on Drought Management for Kharif – 2022"** under the chairmanship of AC & CDRC, DAFE, Govt. of Odisha, on virtual mode through Webex Links on 4th and 25th July, 2022 and under the chairmanship of Agriculture Production Commissioner, Govt. of Odisha, on virtual mode through Microsoft Teams on 1st, 8th and 16th August, 2022.

Dr. M. Ravichandran, Secretary, Ministry of Earth Sciences (MoES) visited Met Watch Office, IGI Airport, Palam on 5th July, 2022 to review met services facilities including functionality of Drishti RVR systems and interacted with officials of IMD at ATC-AAI, DIAL (Air side).

Shri Ashish Kumar, Sc. 'C' participated in a meeting organised by Bihar State Disaster Management Authority, Patna on 15th July, 2022 regarding **Protocol for Dissemination of Information for Disaster Management during ongoing Monsoon Season**.

Dr. D. R. Pattanaik, Sc. 'F' has participated (online) the first Meeting of the **Research Council (RC)** of Institute for Climate Change Studies (ICCS), Kottayam held on 16th July, 2022.

Sr. officials of Directorate General of Hydrocarbons, IMD and INCOIS participated in meeting on 19th July, 2022 to **finalise the proposal for augmentation of observational network to generate customized location specific forecast for offshore industries**.

Dr. M. Rajavel, Sc. 'E' participated in meeting involving MC Bengaluru and NKAFC Dharwad regarding **continuation of activities of NKAFC, Dharwad** on 19th July, 2022.

Shri Vivek Sinha, Sc. 'F' has participated in an online meeting organised by Nagar Rajbhasha Karyavanyan Samiti, Patna on 21st July, 2022.

Dr. Ashutosh Kumar Misra, Sc. 'D' and **Dr. Asha Latwal**, Sc. 'C' attended the online meeting to **"review the current status of activities under GKMS"** chaired by **Dr. K. K. Singh**, Sc. 'G' with

Director/Head from RMCs and MCs of IMD, Scientists from AASD, IMD, New Delhi and Agrimet Division, IMD, Pune, Nodal Officers and Technical Officers from AMFUs on 25th July, 2022.

Dr. Sathi Devi, Sc. 'F' attended the BRICS Expert level workshop (along with **Dr. A. K. Das**, Sc. 'E' and **Smt. Monica Sharma**, Sc. 'D') on 26th July, 2022 at NDMA Bhawan and gave a presentation on 'Early Warning Services of IMD'.

Shri Abhishek Anand, Sc. 'C' participated in **"Table Top Exercise"** by NDMA regarding flood preparedness on 27th July, 2022.

Shri J. P. Gupta, Sc. 'F' attended meeting regarding **present status of rainfall and prediction over Uttar Pradesh in view of less rainfall** under the chairmanship of honorable Chief Minister, Govt. of Uttar Pradesh on 1st August, 2022 at Lucknow.

Shri Raja Sekhar Shivraju, Sc. 'C' attended the **Coastal Security Co-ordination Committee meeting** under the Chairmanship of Commissioner, Vasai-Virar, Maharashtra on 1st August, 2022.

Shri Rahul M., Sc. 'C' attended meeting on **"Implementation of AI based Nowcasting"** involving IMD and MIS Google on 3rd August, 2022.

Dr. A. Bhattacharya, Sc. 'C' and **Shri Debdeep Chakraborty**, Met. 'A', attended the **Co-Ordination Meeting** held at NSCBI Airport, PS on 3rd August, 2022, on the visit of Hon'ble Chief Minister of West Bengal.

Dr. S. D. Attri, Sc. 'G' participated in a seminar on **"Modern Pollution Abatement Techniques to achieve Sustainability in Industries"** organised by the Institution of Engineers during 5-6 August, 2022.



Dr. S. D. Attri during the inauguration of the Seminar

Dr. Pulak Guhathakurta, Sc. 'F' has attended the Project Review Committee (PRC) meeting online on **"Impact of Climate Change on Vector-Borne Disease (VBD)"** held on 5th August, 2022 at ICMR-National Institute of Malaria Research (NIMR), New Delhi.

Dr. Ranjeet Singh, Sc. 'F', attended meeting of **Crop Weather Watch Group for Drought Management (CWWGDM)** with State Government to monitor drought parameter on 5th, 10th, 17th and 23rd August, 2022.

Dr. Sheshakumar Goroshi, Sc. 'E' attended **TNAU-ACRC-IMD-GKMS-Capacity building meeting** and presented use of **ISRO-IMD Vegetation Information System platform** for crop growth monitoring under Gramin Krishi Mausam Sewa (GKMS), 11th August, 2022.

Dr. K. K. Singh, Sc. 'G', **Dr. Sheshakumar Goroshi**, Sc. 'E' and **Ms. Priyanka Singh**, Sc. 'C' attended the launch of the project, "**Leveraging Nationally Determined Contributions (NDCs) to achieve net-zero emissions and climate-resilient development, in response to the climate emergency**" funded by Japan on 11th August, 2022 jointly organized by UNDP and IMD.

Dr. M. Mohapatra, DG, IMD participated in the Meeting under Chairmanship of Principal Secretary to Hon'ble Prime Minister on "**Kharif Crops Sowing Position for current Season (2022) and the Weather Forecast**" through VC on 12th August, 2022.

Dr. M. Mohapatra, DG, IMD participated in the launch of the Project "**Leveraging nationally Determined contributions (NDCs) to achieve net-zero emissions and climate-resilient development, in response to the climate emergency**" organized by UNDP.

Shri K. S. Hosalikar, Sc. 'G', **Dr. A. Kashyapi**, Sc. 'F', **Dr. Kripan Ghosh**, Sc. 'F', **Shri U. K. Shende**, Sc. 'E' and **Dr. Ashutosh Kumar Mishra**, Sc. 'D' attended online meeting on "**NFCS presentation**" on 12th August, 2022.

Shri. N. T. Niyas, Sc. 'D' attended online discussion regarding **preparation of State Action Plan on Climate Change** conducted by Directorate of Environment and Climate change, Kerala held on 16th August, 2022.

Shri Kuldeep Srivastava, Sc. 'E' participated in 15th meeting of "**National Spatial Data Infrastructure (NSDI) Executive Committee**" held in physical mode on 18th August, 2022 to review the progress of NSDI.

Shri Sonam Lotus, Sc. 'E' participated in a meeting regarding **strengthening of observational network of AWS** in Ladakh chaired by **Shri Suagat Biswas**, IAS, Secretary Disaster Management, Ladakh on 18th August, 2022.

Dr. M. Mohapatra, DG, IMD participated as a Resource Person in the informational interview on "**State of Art Practices in Meteorological Forecasting and Role of Engineers**" conducted by School of Electrical and Electronics Engineering, REVA University, Karnataka on 19th August, 2022.

Shri Bikram Singh, Sc. 'F' attended a meeting under the chairmanship of Secretary, Uttarakhand Disaster Management Authority, Government of Uttarakhand on 22nd August, 2022 in connection with the weather forecast issued for 19th August heavy rainfall event. **Shri Bikram Singh**, Sc. 'F' gave a presentation on "**Observed weather and forecast & warnings**" issued by M. C. Dehradun for 19th August heavy rainfall event. They also inquired about the **operations of DWR at Surkanda Ji** and installation of more DWR in Uttarakhand to make weather forecasting more effective.

Shri S. M. Metri, Sc. 'E' and **Shri B. S. Muralidhara**, Met. 'B' attended the **Seventh Technical Evaluation Committee (TEC) Meeting** called by Water Resources Department, GoK at Vikas Soudha on 19th August, 2022.

Dr. K. Naga Ratna, Sc. 'E' attended the meeting conducted by the Hon'ble Minister of Culture, Tourism & DoNER, Govt. of India, with Heads of Offices at Hyderabad on 26th August, 2022.

Dr. O. P. Sreejith, Sc. 'E', **Dr. Satyabhan Bishoy Ratna**, Sc. 'E', **Ms. Arti Bandgar**, Sc. 'C' and **Mr. Prasad Bhor**, Met 'A' participated and attended the online pre-preparatory meeting on 26th August, 2022 regarding the **conduction of SASCOF-23**.

Dr. Rajib Chattopadhyay, Sc. 'E' given an online lecture on "**Climate Change and Sustainable Development Goals: Forecasting and Risk Management**" at IISBWM Kolkata and CII sponsored course work on 26th August, 2022.

Dr. S. Balachandran, Sc. 'F' had meeting with **Shri S. K. Prabakar**, IAS, Commissioner of Revenue Administration, Government of Tamilnadu to discuss forecasting requirements on 29th August, 2022.

Dr. G. N. Raha, Sc. 'E', **Shri U. Das**, Sc. 'C' and **Shri Manoj Biswal**, S.A. attended a meeting to discuss the **progress on the Urban Meteorological Services program** on 29th August, 2022, under the chairmanship of DGM.

Shri J. P. Gupta, Sc. 'F' participated in "**State level committee meeting ground water estimation 2022**" on 30th August, 2022 Chaired by Pramukh Sachiv (Namami Gange Govt. of U.P).

Dr. K. K. Singh, Sc. 'G' and **Dr. Sathi Devi**, Sc. 'F' participated in the meeting under Chairmanship of Secretary, Department of Food & Public distribution, to **discuss the arrangements for procurement of Paddy/Fortified Rice and Coarse grains during the ensuring KMS 2022-2023 (Kharif Crop only)** at New Delhi on 30th August, 2022.

Dr. M. Mohapatra, DG, IMD participated in the meeting under chairmanship of Principal Secretary to Hon'ble Prime Minister to review situation in states affected by flood in 2022 at South Block, PMO, New Delhi on 31st August, 2022.

Dr. M. Mohapatra, DG, IMD had meeting with **Dr. Ranjit Kumar Sinha**, Secretary, Disaster Management Department, Uttarakhand Government on 1st September, 2022 regarding **strengthening of early warning services** in Uttarakhand.

Dr. R. K. Giri, Sc. 'F', IMD participated in the "**Systematic Observations Financing Facility Workshop**" with Implementing Entities and peer advisors through Zoom on 1st September, 2022.

Dr. M. Ravichandran, Secretary, MoES, **Dr. M. Mohapatra**, DG, IMD and **Dr. Sankar Nath**, Sc. 'E' and participated in the meeting on "**Weather Forecasting for using aircraft**" as observation point under the Chairmanship of **Shri Tarun Kapoor**, Advisor to PM through VC on 1st September, 2022.

Dr. Kuldeep Srivastava, Sc. 'E' participated in the 18th Meeting of "**Central Geological Programming Board (CGPB) - XI on Geoinformatics and Data Management**" on 2nd September, 2022.

Dr. K. K. Singh, Sc. 'G', **Dr. S. D. Attri**, Sc. 'G', **Dr. Kripan Ghosh**, Sc. 'F' attended meeting for "**Development of the pull system for use of Agromet information by farmers**" chaired by DGM, MoES on 5th September, 2022.

Dr. S. Dwivedi, Sc. 'C', **Shri R. K. Mohapatra**, Met. 'B' and **Shri S. Patra**, S. A. attended an online training organized by WFP under DAFP, Govt. of Odisha on Master Trainers and Extension Workers using PICSA Tools from 5-9 September, 2022.

Shri K. N. Mohan, Sc. 'G' and **Dr. S. O. Shaw**, Sc. 'F' were invited to RAJBHAWAN Guwahati (Assam) on 11th September, 2022, to attend Seminar on "**Climate Change**".

Dr. Kuldeep Srivastava, Sc. 'E' & **Dr. Sankar Nath**, Sc. 'E' attended **Regional Association II (RA II) Infrastructure Working Group (WG-I) Expert Team meeting** held on 12th September, 2022 through online mode.

Shri Surender Paul, Sc. 'F' and **Shri Harminder Dutta**, Met. 'A' attended on Meeting regarding general discussions on the modalities for the implementation of PMFBY & R-WBCIS under the Chairmanship of the Director of Agriculture, H.P. in the Directorate of Agriculture, H.P., Shimla on 13th September, 2022.

Shri P. S. Kannan, Sc. 'E' attended "**North-East Monsoon preparatory meeting**" chaired by Chief Secretary to Govt. of Tamilnadu at Secretariate on 13th September, 2022.

Dr. Kripan Ghosh, Sc. 'F' attended the "**Expert Team meeting of Working Group on Services**", WMO, **Regional Association II** on 14th September, 2022.

Dr. S. Balachandran, Sc. 'F' attended online meeting conducted by NDMA in connection with **disaster management plan for Tirumala Tirupati Devasthanam temple complex** on 15th September, 2022.

Shri Harmeet Singh Sawhney, Sc. 'E' attended a meeting related to "**Climate Change and Human Health**" held on 15th September 2022 at National Centre for Disease Control.

Dr. S. Dwivedi, Sc. 'C' attended the Meeting on "**User Acceptance Testing for Operational Systems for Integrated Disaster Risk Management for Odisha (SATARK) application**" by RIMES, Thailand at OSDMA, Bhubaneswar on 17th September, 2022.

Dr. Jayanta Sarkar, Sc. 'F' and **Shri S. G. Kamble**, Sc. 'F' attended the event '**Swacch Saagar Surakshit Saagar**' with **Dr. M. Ravichandran**, Secretary, MOES and **Shri Gopal Iyengar**, Sc. 'G', MOES on 17th September, 2022, organized by the Ministry of Earth Sciences.

Dr. D. R. Pattanaik, Sc. 'F' and **Dr. Kuldeep Srivastava**, Sc. 'E' had meeting with Baron Weather Inc., USA at Hotel Imperial, Janpath on 19th September, 2022.

Dr. K. K. Singh, Sc. 'G' and **Dr. S. D. Attri**, Sc. 'G' attended meeting on "**Agriculture Satellites**" chaired by Hon'ble Union Minister of Agriculture on 22nd September, 2022.

Dr. S. O. Shaw, Sc.'F' attended meeting of **Project Review & Steering Group** in respect of the project "**Data processing of ST Radar Data and development of software for NKN upload**" on 23rd September, 2022.

Dr. M. Mohapatra, DG, IMD participated in the **6th Steering Committee Meeting or Common Alerting Protocol (CAP)** based Integrated Alert System through VC organized by NDMA on 29th September, 2022.

TRAININGS

Shri Rakesh Kumar, Sc. 'C', **Shri A. C. Roy**, Met. 'A', **Shri R. Saikia**, Met. 'A', **Shri A. J. Bhuyan**, Met. 'A', **Shri S. Mohadikar**, S. A., **Shri M. Kumar**, S. A., **Shri K. Patgiri**, R. M., **Shri P. Dutta**, Mech. Asstt. Proceeded to IngenTehconology, Kanpur for training of satellite transmitter along with other sensors of AWS/ARG w.e.f 22nd July, 2022.

Dr. Kuldeep Srivastava, Sc. 'E', **Shri Sunny Chug**, Sc. 'C' and **Smt. Komal Srivastava**, S. A. participated in an interactive session-cum-training program on "**Cyber Hygiene**" in Ministry of Earth Sciences (MoES) on 15th September, 2022 through online mode to sensitize the officers about the digital and cyber risks, rapidly growing cyber-crimes and preventive measures, conducted by MHA.

LECTURES/TALK/ WEBINAR

IMD and MoES launched Short Virtual lecture Series on "**Different Modules of Weather & Climate Science & Services**" to commemorate 75 years of independence of India.

Dr. S. D. Attri, Sc. 'G' delivered invited talk (VC) on "**Climate change and Management Strategies**" organised by Geological Society of India on 1st July, 2022.

Dr. Satyaban Bishoyi Ratna, Sc. 'E' delivered an online invited talk on "**Indian Summer Monsoon Variability: Teleconnections and Prediction**" at the Institute of Marine Sciences, National Research Council (CNR-ISMAR), Italy on 15th July, 2022.

Dr. Divya Surendran, Sc. 'C' delivered couple of online lectures on 20- 21 July, 2022 and conducted hands on practical sessions for the staffs of National Center for Hydrology & Meteorology (NCHM), Bhutan, on the topic "**Climapact tool**" which is part of WMO Bhutan CST training program conducted by RIMES, Thailand and NCHM, Bhutan.

Dr. D. R. Pattanaik, Sc. 'F' delivered a talk in National Workshop and Brainstorming meeting on "**Space based Information Support for Climate and Environment Studies : Road to the Future**" on 18-19 July, 2022 at ISRO, New Delhi.



Dr. D. R. Pattanaik, IMD during the workshop

Shri Nahush Kulkarni, Sc. 'C' was invited to deliver lecture on "Early Warning importance and Meteorological services of MC Agartala", at Central Training Institute (CTI) on 29th July, 2022.

Dr. O. P. Sreejith, Sc. 'E' and **Dr. Rajib Chattopadhyay**, Sc. 'E' delivered lecture respectively on "Climate Services for the State of Kerala" and "A study of Malaria and Dengue outbreaks over Kerala based on Climate Indicators" during First "Kerala State Climate Change Stakeholders Consultation Workshop" at Trivandrum, Kerala on 1-2 August 2022.

Dr. Ashutosh Kumar Misra, Sc. 'D' delivered a lecture on "Mandates and Activities of Agricultural Meteorology Division" to the officers from School of Naval Oceanology & Meteorology, Kochi, Kerala on 3rd August, 2022.

Dr. (Smt.) Manorama Mohanty, Sc. 'E' delivered lecture on "Forecasting and Warning System for Cyclone, Flood and Weather in Short Term Training Program-Disaster management & Resilience Building" organized by L. D. Engineering College, Ahmedabad on 3rd August, 2022.

Dr. S. D. Attri, Sc. 'G' addressed the participants as Chief Guest during **Valedictory function of Faculty Development Training Programme on Disaster Risk Reduction** organised by Jamia Milia Islamia, New Delhi on 5th August, 2022.

Dr. M. Mohapatra, DG, IMD delivered an Invited talk on "Weather Forecasting and Indian Climate Changes" during the programme organized by National Science Centre under Azadi Ka Amrit Mahotsav on 10th August, 2022.

Dr. M. Mohapatra, DG, IMD Chaired & delivered Keynote address on "partnership & collaborations for Multi-Hazard Early Warning system in South Asia" on 12th August, 2022 during the International Conference on "Systems Analysis for Enabling Integrated Policy Making" at Scope Convention Centre, Lodi Road, New Delhi during 10-12 August, 2022.

Shri B. P. Yadav, Sc. 'F' delivered a lead talk on "Early Warning & Forecasting Services of IMD for Management of Hydro-Meteorological Disasters" in the International Conference on Systems Analysis for Enabling Integrated Policy Making on 10-12 August, 2022 organised by TIFAC.

Dr. Divya Surendran, Sc. 'C' delivered an online lecture on "Importance of Sector Specific Climate Indices for the better understanding of Climate Change" on 11th August, 2022 as a part of webinar series conducted by Institute for climate change Studies (ICCS), Kerala.

Shri A. K. Singh, Sc. 'E' delivered a lecture at **VINBAX-2022 (a joint exercise of Vietnam & Indian Army for Humanitarian assistance & disaster relief exercise)** on 13th August, 2022 at Army Office Panchkula.

Dr. A. Kashyapi, Sc. 'F' was invited to deliver lecture on the topic "Role of Weather Forecasting and Prediction of Extreme Events" on 30th August, 2022, at the Annual Grape Seminar, 2022 held at Wakad.

Dr. (Smt.) Manorama Mohanty, Sc. 'E' delivered an expert lecture on "Meteorology and Forecasting" at IIPH, Gandhinagar on 1st September, 2022.

Dr. D. R. Pattanaik, Sc. 'F' delivered talk on "SWFP Global Centre IMD" during **Severe Weather Forecast Project -South Asia (SWFP-SA) Meeting of the Regional Subprogramme Management Team (RSMT)**, organised by WMO was held online during 6-7 September, 2022. **Dr. M. Mohapatra**, DG, IMD, chaired the meeting.

Shri Raja Acharya, Met. 'A' attended the **WMO SOT Metadata webinar** on 12th September, 2022 organised by the WMO SOT (Ship Observations Team).

Shri Dhan Singh, Met. 'A', **Shri Raja Acharya**, Met. 'A', **Ms. Laxmi Pathak**, S. A. and **Ms. Twinkle Grover**, S. A. attended the webinar "Navigating the pathways of research publishing in high-quality journals with Scopus and Science Direct" on 16-17 September, 2022 organized by DGM Publication, MoES, KCRNet and Elsevier.

Dr. S. D. Attri, Sc. 'G' delivered invited talk on "Climate, Ozone and Sustainable living" organized by IGN Open University, New Delhi on 16th September, 2022

Dr. S. O. Shaw, Sc. 'F' and **Shri Sunit Das**, Sc. 'E' were invited by Assam Don bosco University Azara, Guwahati to deliver lecture on the topic "Hydro meteorological Instruments and Weather Forecast and Early Warning System" on 19th September, 2022.

Dr. M. Mohapatra, DG, IMD participated as Panelist in the Webinar "2047 – Disaster Risk Reduction" organized by NIDM on 23rd September, 2022.

Dr. M. Mohapatra, DG, IMD delivered Distinguished Keynote address on the topic "In the Eye of the Storm : Tackling Natural Calamities through Precise Projections" in the 3rd Edition of the Economic Times Best Tech Brands organized by The Economic Times at Tango Room, Taj Vivanta, Bengaluru, Bangalore on 23rd September, 2022.

Dr. S. Balachandran, Sc. 'F' delivered talk on "Role of Weather and Climate services for Blue Economy" in the conclave organized by South Indian Chamber of Commerce on 23rd September, 2022.

Dr. M. Mohapatra, DG, IMD participated in the **Twenty-Third Session of South Asian Climate Outlook Forum (SASCOF-23)** and **Climate Services User Forum (CSUF)** during 26-30 September, 2022.

Dr. Sabeer Ali, Sc. 'C' talk on the topic "Experimental Tropical Cyclone Seasonal Forecast over North Indian Ocean (NIO)" in the Twenty-third Session of South Asian Climate Outlook Forum (SASCOF-23) held from 26-29 September, 2022.

PANEL DISCUSSION/ INTERVIEW

Shri Sunny Chug, Sc. 'C' participated as a member of the interview panel for selecting logistics team for **42nd Indian Scientific expedition to Antarctica** at Mahika hall, MoES during 19 - 22 July 2022.

PRESENTATIONS

Dr. S. Bandyopadhyay, Sc. 'F' attended as an Expert and delivered a presentation during an online training program on **"Resilience Measures of Buildings with Special Reference to Floods and Cyclones"** on 21st July, 2022 organized by the National Institute of Disaster Management (NIDM), MHA, Govt. of India, in collaboration with the Department of Geography, the University of Burdwan.

NOMINATIONS

Ministry of Earth Sciences nominated **Shri S. C. Bhan, Sc. 'F'** as Nodal Person from MoES to coordinate for finalization of One Health Inter-Ministerial Declaration and planning of proposed **"One Health Conclave"** agenda.

FOREIGN DEPUTATION

Shri Arulalan T., Sc. 'C', Numerical Weather Prediction, India Meteorological Department, Ministry of Earth Sciences participated in this workshop and presented a poster titled **"Prediction of Western Disturbance Tracks using NCUM-ERP: A Month Ahead"** in **Subseasonal to Seasonal Science and Applications Workshop – 2022** held at Boulder, Colorado, USA.

Shri M. I. Ansari, Sc. E was deputed to participate in **"WMO 2022 Upper-Air Instrument Intercomparison"**, from 5-9 September, 2022 in Lindenberg, Germany.

Dr. Sankar Nath, Sc. E was on deputation to participate **WMO Common Alerting Protocol (CAP) implementation Workshop and Training Course**, during 19-21 September, 2022 at Amsterdam, Neitherland.

Deputation of **Dr. Somenath Dutta, Sc. 'F'**, MTI Pune, to participate in the **"5th Meeting of the EC Capacity Development Panel (CDP)"** from 19-23 September in Geneva, Switzerland.

ACHIEVEMENTS /APPRECIATIONS /AWARDS RECEIVED

Dr. Mrutyunjay Mohapatra, DG, IMD has been nominated as Expert Member of Board of Governors of IIIT Vadodara in August, 2022 under the category **"Eminent person out of research laboratories"**.

The Hon'ble Governor of Odisha and Chancellor of the FM University, **Dr. Ganeshi Lal** conferred **Vyasa Gourab Samman** upon **Dr. Mrutyunjay Mohapatra, DG, IMD** for his contribution to the field of Science (Meteorology) that has led to paradigm shift in cyclone warning services in India and enabled minimising death toll to double digit.



Certificate of Merit was awarded to **Shri P. S. Biju, Sc. 'E' (IMD)** on the occasion of Foundation day of MoES on 27th July, 2022.

Infrastructure Development & Installations

NEW PROJECTS/SCHEMES INITIATED

Scatterometer RVR has been installed at Agartala and Lengpui in July, 2022 and DIWE installed at Tirupati Airport in August, 2022.

DCWIS was installed at Gannavaram Airport, along with DCWIS & PWD at Bhubaneswar Airport and at Kolhapur Airport in September, 2022.

PWD was installed at Jaipur & Amritsar Airport from in September 2022.

राजभाषा अनुभाग

डॉ. एस बंद्योपाध्याय, वैज्ञानिक 'एफ' ने में हिंदी पखवाड़ा कार्यक्रम की अध्यक्षता की और एक सरकारी कर्मचारी के दैनिक जीवन में हिंदी के महत्व पर प्रकाश डालते हुए एक भाषण भी दिया।

राजभाषायी निरीक्षण

माननीय संसदीय राजभाषा समिति की दूसरी उपसमिति द्वारा दिनांक 26 अगस्त, 2022 को मौसम केंद्रगलुरु तथा हवाई अड्डा मौसम स्टेशनकोयंबटूर का निरीक्षण किया गया। इस निरीक्षण में मुख्यालयकी तरफ से महानिदेशक महोदय **डॉ. मृत्युंजय महापात्र** तथा उपनिदेशक (राजभाषा) **श्रीमती सरिता जोशी** ने भाग लिया। दोनों कार्यालयों का निरीक्षण सफल रहा।



माननीय संसदीय राजभाषा समिति की दूसरी उपसमिति द्वारा दिनांक 26 सितंबर, 2022 को मौसम केंद्र-तिरुवनंतपुरम का निरीक्षण किया

गया। इस निरीक्षण में मुख्यालय की ओर से डॉ. के. के. सिंह, वैज्ञानिक 'जी' तथा श्रीमती सरिता जोशी, उपनिदेशक (राजभाषा) ने भाग लिया।

हिंदी दिवस समारोह

मुख्यालय में हिंदी दिवस समारोह 2022 का दिनांक 29 सितंबर, 2022 को सफल आयोजन किया गया। हिंदी दिवस समारोह की अध्यक्षता डॉ. मृत्युंजय महापात्र, महानिदेशक महोदय ने की तथा इस समारोह की मुख्य अतिथि श्रीमती प्रमिला भारती, सुप्रसिद्ध गीत गज़लकार रही। मुख्यालय में हिंदी दिवस/हिंदी पखवाड़ा 2022 के दौरान आयोजित की गई 06 प्रतियोगिताओं के 30 विजेताओं को महानिदेशक महोदय डॉ. मृत्युंजय महापात्र एवं मुख्य अतिथि श्रीमती प्रमिला भारती तथा हिंदी दिवस समारोह समिति के अध्यक्ष डॉ. के. के. सिंह, वैज्ञानिक 'जी' के हाथों से पुरस्कार एवं प्रमाण पत्र प्रदान किए गए। माननीय महानिदेशक महोदय डॉ. मृत्युंजय महापात्र जी द्वारा विभागीय गृह पत्रिका 'मौसम मंजूषा के 35^{वें} संस्करण' का विमोचन किया गया।



Research & Publications

Twenty one (21) research articles have been published in MAUSAM (Vol. 73, No. 3), July, 2022 issue. Following are the research articles published in MAUSAM and other extra departmental journals which are authored by IMD Officials:

Sahu, Rajesh Kumar, Bishma Tyagi, Naresh Krishna Vissa and Mrutyunjay Mohapatra, 2022, "Pre-Monsoon Thunderstorm Season Climatology of Convective Available Potential Energy (CAPE) and Convective Inhibition (CIN) over Eastern India", *MAUSAM*, 73, 3, 565-86. <https://doi.org/10.54302/mausam.v73i3.1247>.

Ray, K. and Kannan, B., 2022, "Validation of Cloud Burst over Chennai in 2015 using Radar data", *MAUSAM*, 73, 3, 587-596. <https://doi.org/10.54302/mausam.v73i3.214>.

Pai, D. S., and Smitha Nair, 2022, "Impact of El-Niño-Southern Oscillation (ENSO) on Extreme Temperature Events over India", *MAUSAM*, 73,3, 597-606, doi: <https://doi.org/10.54302/mausam.v73i3.5932>.

Ansari, M. I., and Ranju Madan, 2022, "Sustenance of Global Climate Observation System Upper Air Network (GUAN) of India Meteorological Department", *MAUSAM*, 73, 3, 637-650. <https://doi.org/10.54302/mausam.v73i3.2197>.

Tomar, C. S. 2022. "Unprecedented Weather Activity Over Northwest India on 23rd May, 2016", *MAUSAM*, 73, 3, 705-709. <https://doi.org/10.54302/mausam.v73i3.5938>.

Phukan, Ranjan, Shivinder Singh, and D. Saha. 2022. "An Objective Method for Forecasting Thunderstorms Over Agartala Using Stability Indices", *MAUSAM*, 73, 3, 710-716. <https://doi.org/10.54302/mausam.v73i3.5939>.

Thapliyal, Rohit. 2022, "The Analysis of Stratospheric Ozone and Meteorological Parameters Observed at Bharati Station, Larsemann Hills, Antarctica During 37th Indian Scientific Expedition to Antarctica", *MAUSAM*, 73, 3, 607-616. <https://doi.org/10.54302/mausam.v73i3.1322>.

Singh, T. P. and S. M. DESHPANDE, 2022, "Changes in the Means of Temperatures and Rainfall of the Period 1981-2010 with respect to Mean Values of 1951-80 over the Indian Stations", *MAUSAM*, 73, 3, 499-510. <https://doi.org/10.54302/mausam.v73i3.5930>.

NaskarPravatrabhi, and Somnath Naskar, 2022, "A New Neurocomputing Approach for Medium-Range Temperature Prediction", *MAUSAM*, 73, 3, 537-54. <https://doi.org/10.54302/mausam.v73i3.5931>.

Satya Prakash and S. C. Bhan, 2022, "Assessment of INSAT-3D-derived high-resolution real-time precipitation products for North Indian Ocean cyclones", *Natural Hazards (Springer Nature)*, 999999, 1-17, 10.1007/s11069-022-05582-7.

Tapajyoti Chakraborty, Sandeep Pattnaik, HimadriBaisya, and Vijay Vishwakarma, 2022, "Investigation of Ocean Sub-Surface Processes in Tropical Cyclone Phailin Using a Coupled Modeling Framework: Sensitivity to Ocean Conditions", *MDPI Oceans*, 3, 3, 364-388, <https://doi.org/10.3390/oceans3030025>.

Rizwan Ahmed, Mrutyunjay Mohapatra, Suneet Dwivedi, Ram Kumar Giri, Shashi Kant, 2022, "An overview of satellite Consensus(SATCON) algorithm to estimate tropical cyclone intensity over the North Indian Ocean", *JESS- Springer Nature*, ISSN 0253-4126, eISSN 0973-774X (online), 131, 3, 100-100, <https://doi.org/10.1007/s12040-022-01901-5>.

Prafull Yadav, Avinash N. Parde, Narendra Gokul Dhangar, Gaurav Govardhan, Deen Mani Lal, Sandip Wagh, Dasari S. V. V. D. Prasad, Rizwan Ahmed and Sachin D. Ghude, 2022, "Understanding the genesis of a dense fog event over Delhi using observations and high-resolution model experiments", *Model. Earth Syst. Environ.*, 2022, <https://doi.org/10.1007/s40808-022-01463-x>.

Anwesa Bhattacharya, Chandra Venkataraman, Tanmay Sarkar, Amit Kumar Sharma, Arushi Sharma, S. Anand, Dilip Ganguly, Rohini Bhawar, Sagnik Dey, Sudipta Ghosh, 2022, "An analysis of the aerosol lifecycle over India: COALESCE intercomparison of three general circulation models", *Journal of Geophysical Research: Atmospheres*, 127, e2022JD036457, <https://doi.org/10.1029/2022JD036457>.

Chandu, Kavitha, Mahalakshmi, D.V., Kanchana, A. L., Mahesh, P., Dharmaraju, A. and Dasari, Madhavaprasad, "Air Pollution and COVID-19: Any Causal Link?" *Environmental Protection and Natural Resources*, 33, 1, 32-45. <https://doi.org/10.2478/oszn-2022-0003>.

A. Munsj, A. P. Kesarkar, J. N. Bhate, K. Singh, A. Panchal, G. Kutty. M. M. Ali, Ashish Routray and **R. K. Giri**, 2022, **“Atmosphere-upper-ocean interactions during three rare cases of rapidly intensified tropical cyclones over North Indian Oceans”**, *Journal of Oceanography* <https://doi.org/10.1007/s10872-022-00664-3>.

Arpita Munsj, Amit Keserkar, Jyoti Bhate, Kasturi Singh, Abhishek Panchal, Govindan Kutty and **Ram Kumar Giri**, 2022, **“Simulated dynamics and thermodynamics processes leading to the rapid intensification of rare tropical Cyclones over the North Indian Oceans”**, *JESS*, <https://doi.org/10.1007/s12040-022-01951-9>.

Ramashray, Yadav, **R. K. Giri**, S. C. Bhan, 2022, **“High-Resolution Outgoing Long Wave Radiation data (2014-2020) of INSAT-3D Imager and its comparison with Clouds and Earth’s Radiant Energy System (CERES) data”**, *Advances in Space Research* (2022), doi: <https://doi.org/10.1016/j.asr.2022.05.053>.

Ramashray Yadav, **R. K. Giri**, N. Puvirasan & S. C. Bhan, 2022, **“Annual, Seasonal, Monthly & Diurnal IPWV analysis and precipitation forecasting over the Indian subcontinent based on monthly thresholds of ground-based GNSS-IPWV”**, *Advances in Space Research*, <https://doi.org/10.1016/j.asr.2022.07.0>.

Kavitha Chandu, **Dharma Raju**, S. V. J. Kumar, Madhava Prasad Dasari and **Y. K. Reddy**, 2022, **“Operational Constraints on Flight Navigation Due to Fog and Consequent Economic Implications at the Rajiv Gandhi International Airport, Hyderabad, Telangana, India”**, *Asian Journal of Water, Environment and Pollution*, 19, 4, 25-32, 10.3233/AJW220052.

Guhathakurta, P. and Wagh, N., 2022 **“Analysis of Droughts in South-West Indian Ocean Countries using SPI and SPEI and their Relationship with Global SST”**, *Journal of Natural Resources and Development*, 12, 60-81. <https://doi.org/10.18716/ojs/jnrd/2022.12.04>.

A. A. Fousiya, G. H. Aravind, H. Achyutan, S. Chakraborty, **R. Chattopadhyay**, A. Datye, C. Murkute, A. M. Lone, R. H. Kripalani, M. G. Yadava, P. M. Mohan, 2022, **“Modulation of the precipitation isotopes by the dynamic and thermodynamic variables of the atmosphere in southern parts of India”**, *Water Resources Research*, 58, e2021WR030855. <https://doi.org/10.1029/2021WR030855>.

“Climatological Tables of Observatories in India 1991-2020” was released on MoES Foundation Day by Hon’ble Minister, Earth Science on 27th July, 2022.

Cyclone warning division, IMD prepared the **“TCP-21 (Edition 2022)”** in September, 2022. It was published by World Meteorological Organisation (WMO) and also put up on RSMC website at www.rsmcnewdelhi.imd.gov.in.

Outreach and Media Interaction

IMD issued daily weather forecasting video of about 5 minutes duration in English & Hindi through YouTube, Facebook, Twitter and IMD website. The forecast videos in regional language were issued by regional offices of IMD regularly.

Weekly Video on extended range forecast (upto two weeks) were issued every Thursday through website and social media (Facebook, Twitter, YouTube etc.).

Dr. M. Mohapatra, DG, IMD participated as Chief Speaker during the Prime Time English Show **“Perspective”** discussing on **“Monsoon Changing Patterns”** organized by Sansad TV through Zoom on 22nd August, 2022.

Dr. Geeta Agnihotri, Sc. ‘F’ answered 45 Weather Enquiries by Electronic and Print Media during July to September 2022.

40 weather enquiries and 45 video bytes to print and electronic media in Kannada on weather forecast on daily basis sent by **Shri A. Prasad**, Sc. ‘D’ through Whatsapp Groups

Dr. H. R. Biswas, Sc. ‘F’ briefed key Officials of Govt. of Odisha, Print and Electronic media about the system, its intensification and movement during the period.

Visitors

Delegation from Nigeria visited IMD on 20th July, 2022.

Shri D. S. Mishra, Chief Secretary, UP visited IMD to discuss about the **improvements in observational network in Uttar Pradesh and technical support from IMD** with **Dr. M. Mohapatra**, DG, IMD and scientists on 8th August, 2022

The students of Hiralal Majumder Memorial College for Women, Konnagar, Hooghly, visited RMC Kolkata on 26th August, 2022.

Middle level officers of three-day training programme on **‘Coastal Hazard Management’** conducted by the Anna Institute of Management, Chennai, visited RMC Chennai on 18th Aug., 2022.



State disaster Management Authority (SDMA) officials visited MC Agartala to understand the working of Meteorological Services on 28th July, 2022.