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National Crisis Management Committee Meeting CYCLONE 'JAWAD'



Dr. M. Mohapatra, DG, IMD at National Crisis Management Committee Meetings

Bay of Bengal witnessed formation of the cyclonic storm "Jawad" during 2-6 December, 2021.

Dr. Mrutyunjay Mohapatra, DG IMD, presented the status of cyclone 'JAWAD' during Special Review Meeting chaired by **Shri Narendra Modi, Hon'ble Prime Minister of India** and **Shri Ashwini Vaishnaw, Hon'ble Minister for Railways** and National Crisis Management Committee Meeting Chaired by Cabinet Secretary on 2nd December, 2021.

A joint press conference was addressed by DG, IMD and DG NDRF on 3rd December, 2021 to sensitize masses.

2nd Hindi Parliamentary Committee Meeting

Mrs. Rita Bahuguna Joshi, Hon'ble M.P. and Convener, Hindi Parliamentary Committee chaired 2nd Hindi Parliamentary Committee Meeting at Gangtok on 26 October, 2021 which was attended by **Ms. Indira Murthy**, Joint Secretary and **Shri Manoj Abusaria**, Joint Director (Hindi) Ministry of Earth Sciences, **Dr. S. D. Attri**, Sc. 'G', DGM, New Delhi, **Dr. S. Bandopadhyay**, Sc. 'F', RMC Kolkata and **Dr. R. N. Raha**, Sc. 'E', M.C. Gangtok.



माननीय संसदीय राजभाषा समिति की दूसरी उपसमिति द्वारा दिनांक 23 अक्टूबर, 2021 को मौसम केंद्र गंगटोक का राजभाषायी निरीक्षण

CELEBRATION OF AZADI KA AMRIT MAHOTSAV

To commemorate the 75th anniversary of Independence of India, India Meteorological Department celebrated Iconic week during 18-24 October, 2021 as a part of 'Azadi Ka Amrit Mahotsav'. During this period, Lecture series, webinars and drawing, poem and quiz competitions on the theme of weather and climate were organised by the IMD at its various offices located throughout India.

विशेष कार्यक्रम

जलवायु और मौसम विज्ञान की दिशा में बढ़ते कदम

विशेषज्ञ - डॉ. मृत्युंजय महापात्र, महानिदेशक, भारतीय मौसम विज्ञान विभाग
भेंटकर्ता - निशा भारद्वाज
प्रसारण : 21 अक्टूबर 2021, प्रातः 11:30 बजे

AIRLiveNews 24x7, Indraprastha Channel & 'Akashvani AIR' YouTube Channel

प्रसार भारती

Plan Review meeting



Dr. M. Ravichandarn, Secretary, MoES chaired Plan Review Meeting of IMD on 17th December, 2021.

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Tel. : 011- 43824298
Telefax : 91-11-24699216 &
91-11- 24623220

<https://mausamjournal.imd.gov.in/>
email : mausamps@gmail.com

Edited by

Dr. S. D. Attri
Mr. Sunny Chug

Compiled by

Raj Kumar Verma

Dinesh Khanna

Twinkle Grover



<https://www.facebook.com/profile.php?id=100008764207136>



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Monthly Weather Summary

October

Withdrawal of Southwest Monsoon 2021

The withdrawal of southwest monsoon started on 6th October 2021 from Gujarat and Rajasthan against its normal on 17th September. The SW monsoon withdrew from the entire country on 25th October 2021 against its normal on 15th October. The date of withdrawal of southwest monsoon 2021 from the entire country is the seventh most delayed monsoon withdrawal (on or after 25th October) during 1975-2021. During recent years of 2010-2021, late withdrawal (25th Oct or later) happened for five years, viz., 2017, 2010, 2016, 2020 and 2021.



Severe cyclonic storm Shaheen over BoB (30 Sep to 4 Oct)

The remnant of cyclonic storm Gulab emerged as a well marked low pressure area into south Gujarat region & adjoining Gulf of Khambhat in the morning (0830 hours IST) of 29th Sep. Under favourable environmental and sea conditions, it concentrated into a depression over northeast Arabian Sea (AS) & adjoining Kutch, in the morning (0530 hours IST) of 30th Sep. Moving west-northwestwards, it further intensified into a deep depression over the same region in the midnight (2330 hours IST) of 30th Sep. Thereafter it moved westwards and intensified into cyclonic storm "Shaheen" over the northeast AS off Gujarat coast in the morning (0530 hours IST) of 1st October. Moving westwards for some time, it moved west-northwestwards and intensified into a severe cyclonic storm in the evening (1730 hours IST) of 1st October over northwest & adjoining northeast Arabian Sea. The Observed track of the system during 30th Sept. to 4th Oct, 2021 along with the track of Cyclonic storm 'Gulab' is given in figure.

November

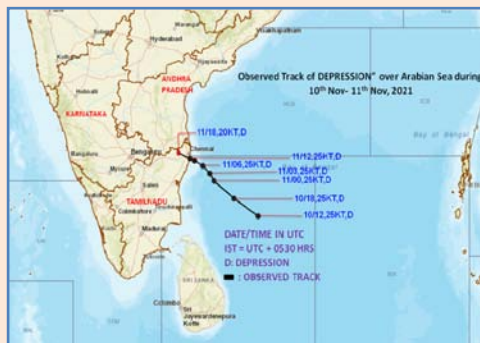
Depression over the Arabian Sea during 7-8 November

A low pressure area formed over central parts of south BoB at 0830 IST of 27th October, 2021. It moved westwards and emerged into Comorin Area at 0830 IST of 1st November. Continuing to move westwards, it emerged into southeast Arabian Sea (AS) at 0830 IST of 3rd. It lay as a well-marked low pressure area over east-central AS at 0830 IST of 6th. It concentrated into a depression over east-central AS at 0830 IST of 7th. It moved west-northwestwards till 0830 IST of 8th.



Depression over the Bay of Bengal during 10-12 November

A low pressure area formed over the southeast Bay of Bengal (BoB) and neighbourhood at 0830 IST of 9th November, 2021. It lay as a well-marked low pressure area over southeast and adjoining southwest BoB at 0530 IST of 10th. It moved west-northwestwards and concentrated into a depression over southwest BoB at 1730 IST of 10th. Moving further northwestwards, it crossed north Tamil Nadu & adjoining south Andhra Pradesh coasts close to Chennai. It weakened into a Well-Marked Low pressure Area over north Tamil Nadu & neighbourhood at 0530 IST of 12th.



Depression over the Bay of Bengal (18-19 November)

December

Cyclonic Storm JAWAD over SE Bay of Bengal 2-5 Dec 2021

A Low Pressure Area formed over South Thailand & neighbourhood in the forenoon (0830 IST) of 30th November, 2021. It emerged into central parts of Andaman Sea at 1730 hrs IST and lay as a well marked low pressure area over southeast Bay of Bengal (BoB) & adjoining Andaman Sea in the morning (0530 hrs IST) of 2nd December. Under favourable conditions, it concentrated into a depression over southeast BoB at 1730 hours IST. Moving north-northwestwards, it concentrated into a deep depression over westcentral & adjoining south BoB in the morning (0530 hours IST) and into the Cyclonic Storm "JAWAD" (pronounced as JOWAD) over westcentral BoB in the forenoon (1130 hours IST) of 3rd. It moved north-northeastwards till morning (0530 hours IST) of 4th Dec.

Thereafter, it moved north-northeastwards and reached very close to Odisha coast, about 50 km southeast of Puri in the afternoon (1430 hours IST) of 5th and 30 km southeast of Paradip at 1730 hours IST of 5th as a depression.

As the cyclone moved very close to Odisha coast on 5th, it caused heavy to extremely heavy rainfall activity affecting Odisha coast on 5th and 6th and Gangetic West Bengal coast on 6th Dec. Very heavy rainfall (maximum 9 cm) was reported in Ganjam district on 5th Dec and extremely heavy rainfall (maximum 23 cm) was reported in Jagatsinghpur district of Odisha on 6th. Very heavy rainfall was reported in Hooghly district of Gangetic West Bengal on 6th Dec. It also caused strong winds over Odisha coast. Meteorological Office at Puri reported MSW of 18 knots during 1030-1130 hrs IST (0500 to 0600 UTC) of 5th December, high wind speed recorder at Paradeep reported MSW of 26 knots at 1530 hrs IST of 5th December. Dhamra Port reported south-southeasterly winds of intensity 32 knots gusting to 35 knots at 4th/1130 hrs IST.

Contd. from Page 2;

Monthly Weather Summary

October



Low Pressure Area over Bay of Bengal

A Low Pressure Area has formed over Eastcentral Bay of Bengal & neighbourhood and it lay over northern parts of Central Bay of Bengal & neighbourhood in the morning of 14th Oct, 2021; moving west-northwestwards, it lay over Westcentral & adjoining Northwest Bay of Bengal off north Andhra Pradesh-south Odisha coasts on 15th, over north Coastal Andhra Pradesh & adjoining Westcentral Bay of Bengal on 16th, over north Telangana & neighbourhood on 17th and over SW Madhya Pradesh & neighbourhood on 18th; the low pressure area has become less marked in the early morning hours of 19th.

Temperature Scenario: (i) The mean temperature for the month of Oct 2021 for the country as a whole was 26.79 °C which was above normal by 0.77 °C. (ii) The highest maximum temperature of 39.9 °C had been recorded at Ganganagar (West Rajasthan) on 9th Oct 2021 and the lowest minimum temperature of 9.5 °C had been recorded at Mandla (East M) on 31st Oct 2021 over the plains of the country during the month.

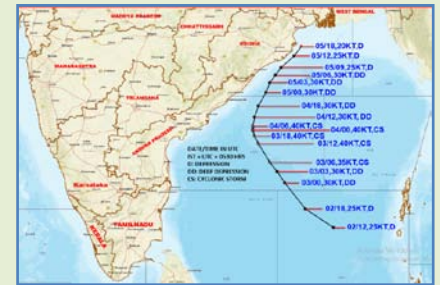
November

A Low Pressure Area (LPA) formed over south Andaman Sea & adjoining Thailand coast at 0830 IST of 13th Nov. It persisted as a low pressure area over south BoB for around 4 days. It moved westwards and lay as a well-marked low pressure area over southwest & adjoining west-central BoB off north Tamil Nadu and South Andhra Pradesh coasts at 0530 IST of 18th. Under favourable environmental conditions, it concentrated into a depression over SW BoB off North Tamil Nadu coast at 0830 IST of 18th. It moved west-northwestwards and crossed north Tamil Nadu coast & adjoining south Andhra Pradesh coasts between Puducherry and Chennai.



Temperature Scenario: (i) The mean temperature for the month of Nov 2021 for the country as a whole was 23.50 °C which was above normal by 0.28 °C. (ii) The highest maximum temp of 37.1 °C had been recorded at Ratnagiri (Konkan & Goa) on 16th Nov 2021 and the lowest minimum temp of 5.2 °C had been recorded at Sikar (East Rajasthan) on 17th November, 2021.

December



About seven Western disturbances (WD) and four induced cyclonic circulations affected Northwest India during the month. Scattered to fairly widespread rainfall/snowfall/thunderstorms occurred over Western Himalayan Region during the passage of four of these WDs with isolated hailstorm activity in these areas, under the impact of two of these WDs. Movement of easterly waves caused scattered to fairly widespread rainfall/thunderstorm activity over extreme south Peninsula during two occasions (2-6 Dec and 30-31 Dec) in the month.

Temperature Scenario : (i) The mean temperature for the month of December-2021 for the country as a whole was 20.72 °C which was above normal by 0.23 °C. The normal temperature for the month is 20.49 °C. (ii) All India averaged temperature during the year 2021 was 25.93 °C which was above normal by 0.43 °C. The normal temperature is 25.5 °C. (iii) The lowest minimum temp. of -2.6 °C had been recorded at Churu (West Rajasthan) on 19th December, 2021 over the plains of the country during the month.

Press release

NORTHEAST MONSOON, 2021

- a) 2021 Northeast Monsoon (October to December rainfall over the south Peninsular India consisting of five meteorological subdivisions (Tamil Nadu, Coastal Andhra Pradesh, Rayalaseema, Kerala and South Interior Karnataka) is most likely to be normal [89-111% of Long Period Average (LPA)].
- b) Monthly rainfall for the 2021 October over the south Peninsula is most likely to be normal [87-113 % of Long Period Average (LPA)].

- c) Monthly rainfall for November 2021 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 above normal [>122% of Long Period Average (LPA)].
- d) Monthly rainfall for December 2021 over the south Peninsular India consisting of five meteorological subdivisions of Tamil Nadu, Puducherry & Karaikkal, Coastal Andhra Pradesh & Yanam, Rayalaseema, Kerala & Mahe and South Interior Karnataka is most likely to be above normal [>132% of Long Period Average (LPA)].
- e) NE monsoon season received 579.1 mm of rainfall against 338.4 mm normal (171 % of LPA).

Significant Events

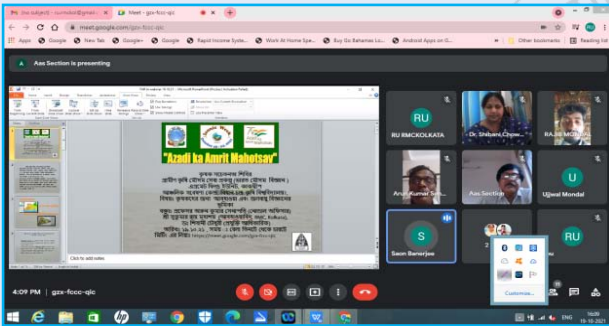


India Meteorological Department celebrated Iconic week from 18 to 24 October 2021 as a part of Azadi Ka Amrit Mahotsav.

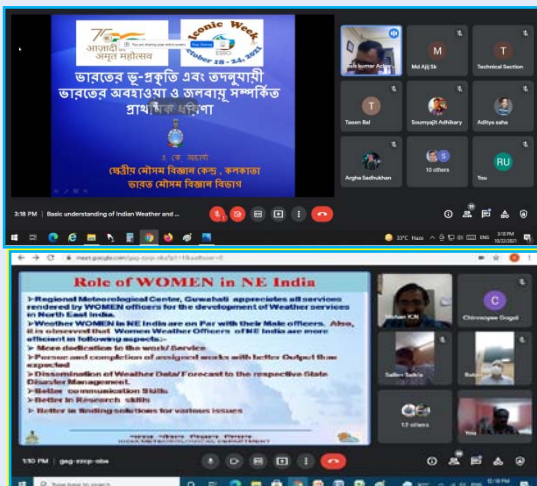
Webinar on various topics related to weather and climate were organized by DGM HQ. office, Climate Research and Services, Pune, Regional Meteorological Centers, Meteorological Centers for the general public to increase the awareness regarding weather.

A specialised lecture on “Weather and climate services” was delivered by Shri Anand Sharma, Ex Sc. ‘G’, IMD New Delhi for visually impaired students / teachers through virtual medium. DG, IMD released the document provided in Braille script of the lecture on “Weather and Climate Services”.

An online Programme on ‘Awareness on services provided under Gramin Krishi Mausam Sewa (GKMS) scheme’ jointly organised by IMD, ICAR, and State Agricultural Universities (SAUs) was held on 21st October, 2021. Around 225 farmers from various parts of Maharashtra state have participated in the programme.



Specialized lectures on “Weather and Climate Services – Advancement in Northeast India” and “Contribution of Women in Climate and Weather Science” under the chairmanship of DGM, IMD were organized by IMD on 23rd October, 2021 and 24th October, 2021 respectively including panel discussion. Live streaming of the webinar was also done through YouTube. Similarly, Regional Meteorological Centre, Guwahati organized a webinar on 24 Oct, 2021 on Role of Women in Weather Services in North East India.



Dr. S. D. Attri, Sc. ‘G’ delivered talks on “Weather and Climate Service” at DTU, New Delhi on 21 October, 2021 and on “Climate Change and Environment Management” through Webex and Youtube on 23 October, 2021 on the occasion of Azadi Ka Amrit Mahotsav.

IMD Hq. organized the quiz, poetry and posters competition on “Weather and Climate”. These were organized on line through the website mygov.in. Nos. of persons participated in these activities are detailed below:

- (i) Quiz : 22836
- (ii) Poem : 1119
- (iii) Poster : 535



Dr. S. D. Attri, Sc. ‘G’ & Head (Urban), IMD and Dr. Sultan Singh, Head GIS, GMDA, Govt. of Haryana signed LoA on 6th December, 2021 at IMD New Delhi in the presence of DGM and senior officers of IMD & GMDA for Setup an Environment and Climate Monitoring System.



PRE-CYCLONE EXERCISE MEETING

India Meteorological Department (IMD) organized the on-line pre-cyclone exercise meeting on 25th October, 2021 under the chairmanship of **Dr. Mrutyunjay Mohapatra**, DG, IMD to review the preparedness, take stock of requirements, plan for the cyclone season October-December, 2021 and share new initiatives by IMD with stake holders. Various national and state level disaster managers including experts from Ministry of Home Affairs (MHA), National Disaster Response Force (NDRF), National Disaster Management Agency (NDMA), Department of Fisheries, Central Water Commission (CWC), Indian Air Force (IAF), Indian Navy (IN), Ministry of Port & Shipping, Ministry of Oil Industry, Ministry of Defense, Ministry of Petroleum & Natural Gas, Ministry of Health & Family Welfare, Ministry of Railways, All India Radio, Doordarshan, Coast Guard, Government of West Bengal, Odisha, Andaman & Nicobar Islands, Andhra Pradesh, Tamil Nadu, Puducherry, Kerala, Karnataka, Goa, Maharashtra, Gujarat, sister organizations of IMD including National Centre for Medium Range Weather Forecasting (NCMRWF), Indian National Centre for Ocean Information Services (INCOIS), Indian Institute of Tropical Meteorology, Pune, Indian Institute of Technology (IIT) Delhi, Area Cyclone Warning Centres of IMD at Chennai, Mumbai, Kolkata, Cyclone Warning Centres at Bhubaneswar, Visakhapatnam, Thiruvananthapuram & Ahmedabad, Radar Divisions at various coastal states and experts of IMD at Delhi Office participated in the meeting. DGM IMD briefed the participants about new initiatives in warning services of IMD that has helped minimize loss of life to less than 100 in recent years. The participants appreciated the services provided by IMD and further requested IMD to also tag their departments in IMD posts on facebook and twitter.

VIGILANCE AWARENESS WEEK

Vigilance Awareness Week was observed during 26th October, 2021 to 1st November, 2021 at IMD in respective division and all the officials took pledge pertaining to integrity.

SAMVIDHAN DIWAS

IMD observed **Samvidhan Diwas (Indian Constitution Day)** on 26th November, 2021. The preamble was read and an online quiz on Constitutional Democracy was held and certificated were provided to the participants.

One (1) DIWE-4 was installed at AMS Ludhiana. 07 ARGs in Punjab, 04 ARGs in Haryana and 02 AWS in Haryana installed.

Human Resource Development Activities

PANEL DISCUSSION

Dr. Mrutyunjay Mohapatra, DG, IMD participated as Panelist at the Session '**Imperatives of the 6th Pune Dialogue on National Security, 2021**' organized by Pune International Centre on 29th October, 2021.



Dr. S. D. Attri, Sc. 'G' delivered talk on "**Challenges and Opportunities of Climate Change**" in UP Government State Conclave on Climate Change on 29th October, 2021.

Dr. D. S. Pai, Sc. 'G' and **Dr. O. P. Sreejith**, Sc. 'E' participated in a panel discussion on the "**Weather and Climate Service of IMD**" in **INTROMET-2021** sessions on 25th November, 2021.

WORKSHOP

Shri R. Balasubramanian, Sc. 'E' and **Shri Raja Acharya**, Met. 'A' participated in the "**WMO Common Alerting Protocol (CAP) Implementation virtual workshop 2021**" organized by **World Meteorological Organization (WMO)** during the period 13-14 October, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD delivered inaugural address during the **7th WMO International Workshop on Monsoons (IWM-7) (Online) Training Workshop on Sub-Seasonal to Seasons (S2S) Prediction of Monsoons** on 1st November, 2021.

Dr. M. Mohapatra, DG, IMD presided in the Inaugural Function of '**WMO workshop on HydroSOS for Ganga, Brahmaputra and Meghna River Basin**' on 23rd November, 2021 organized by IMD, CWC and WMO at New Delhi.

Shri Raja Acharya, Met. 'A' participated in the "**Third International Workshop on Satellite Analysis of Tropical Cyclones (IWSATC-3)**" organized by World Meteorological Organization (WMO) during the period 7-10 December, 2021.

MEETINGS / VIDEO CONFERENCES

Dr. S. D. Attri, Sc. 'G' participated in "**3rd Meeting of Expert Team on Agric. Risk Management (ET- ARM) of SERCOM of WMO**" on 3rd October, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD delivered the inaugural address in '**International Group Fellowship Training program**' on "**Numerical Weather Prediction**" being organized jointly by IMD and WMO on 4th October, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD and other senior officers participated in the meeting regarding "**Memorandum of Understanding for Data Sharing between Government of Jammu & Kashmir and IMD**" on 7th October, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD participated in the meeting on **“National Organising Committee of International Workshop on Monsoon (IWM) 7”** on 8th October, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD participated in six meetings of **“Extraordinary Congress (2021)”** of WMO through Video Conference during 11-22 October, 2021.

Shri A. K. Singh, Sc. ‘E’ delivered lecture on **‘Services provided by IMD for the power sector’** in the meeting on **“Software tools available for day ahead load and weather forecasting for Discoms”** at Panchkula on 11th October, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD participated in the meeting under Chairmanship of Union Home Secretary to review the **Preparedness on the landslide incidents in the State of Uttarakhand and Himachal Pradesh** at North Block, New Delhi on 13th October, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD participated in the meeting with **Shri Bhagwat Kishanrao Karad**, Hon’ble Minister of State (Finance) on 13th October, 2021 in connection with installation of **Doppler Weather Radar** in Aurangabad.

Dr. Kripan Ghosh, Sc. ‘F’, **Shri R. Balasubramanian**, Sc. ‘E’ and **Dr. Asha Latwal**, Sc. ‘C’ attended the meeting to **“discuss integration of advisory module between IMD and DoA applications”** organised by Maharashtra Agriculture Department on 13th October, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD participated in the meeting with **Shri Deepak Kapoor**, Vice Chairman & Managing Director, Maharashtra Airport Development Co. Ltd. regarding issues related to Shirdi Airport on 25th October, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD participated in the meeting of ‘Executive Council-74 of WMO’ to follow-up on the **“decisions of Cg. Ext. (2021)”** through Video Conference on 25th, 27th and 28th October, 2021.

Shri Raja Acharya, Met. ‘A’ participated in the **Virtual Meeting “Second Miniforum on Tropical Cyclone Outlook in the South West Indian Ocean”** organized jointly by the WMO, WMO Regional Center for Tropical Cyclones La Réunion (France), the Indian Ocean Regional Intervention Platform (PIROI) on 28th October, 2021.

Dr. K. K. Singh, Sc. ‘G’ attended the Meeting of **Fertilisers Association of India (FAI) Advisory Committee** on **“Agricultural Sciences”** was held on 21st October, 2021 at 10.00 hrs. under the Chairmanship of **Dr. S. K. Chaudhari**, Dy. Director General (NRM), ICAR, New Delhi. The meeting was held virtually.

Dr. Mrutyunjay Mohapatra, DG, IMD participated as Chief Guest at the Inaugural Session of the One Week Interdisciplinary Online Faculty Development Programme on **“Youth and Climate Change”** of Bhaskaracharya College of Applied Sciences, University of Delhi and Catholicate College, Pathanamthitta, Kerala on 27th October, 2021.

Dr. K. K. Singh, Sc. ‘G’ and **Dr. S. K. Goroshi**, Sc. ‘E’ attended and presented GKMS-current status and future plan in **‘Project Monitoring and Advisory Committee (PMAC)’** meeting held through VC on 28th October, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD delivered the Inaugural Address during the Webinar on **“1999 Odisha Super Cyclone: Recalling the Lessons and Advancement”** organized by NIDM on 29th October, 2021.



Shri R. Balasubramanian, Sc. ‘E’ attended the **“26th session of the conference of the parties to the climate change convention COP (26)”** held in Glasgow, UK & Northern Ireland during 31st October, 2021 to 12th November, 2021 organised by World Meteorological Organisation (WMO).

Dr. Mrutyunjay Mohapatra, DG, IMD made a presentation on **“Unseasonal Rains in different parts of India”** in the meeting of the Department-related Parliamentary Standing Committee on Science and Technology, on Environment, Forests and Climate Change at Parliament House on 1st November, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD and **Shri Sanjeev Kumar**, Chairman, Airport Authority of India jointly chaired the 36th Standing Committee Meeting on 2nd November, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD participated in the meeting with **Ms. Madhumita Dash**, Principal AI Research Engineer, FASAL regarding **“Collaboration between IMD and Fasal for developing nowcasting technology for Indian farmers”** on 2nd November, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD participated in the meeting of the **‘UN Frame Work Convention on Climate Change COP26’**, organized by the Water and Climate Coalition Leaders, entitled **“Committing to an Integrated Global Water and Climate Agenda”** on 2nd November, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD participated in the meeting regarding **‘weather forecast for oil fields of ONGC’** on 3rd November, 2021.

Dr. S. D. Attri, Sc. 'G' attended the meeting regarding '**Cost of forecast products**' chaired by **ASFA, Ministry of Earth Sciences** on 3rd November, 2021.

Dr. M. Mohapatra, DG, IMD made a presentation on "**Safety and Security of Oil Installations of Public Sector Oil Companies: Weather Forecasting including Cyclone Warnings**" during the meeting of the Department related Parliamentary Standing Committee on **Petroleum & Natural Gas** on 9th November, 2021.

Dr. M. Mohapatra, DG, IMD participated in the discussion on "**Implementing landslide susceptibility mapping for a region in India**" involving NRSC, GSI and IMD on 10th November, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD chaired the **Valedictory Programme of the International Group Fellowship Training Program on "Numerical Weather Prediction"** jointly organized by Meteorological Training Centre Pune, IMD and WMO on 10th November, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD participated in the meeting with **Shri Arunachalam**, Chief Operating Officer and **Shri A. Banerjee**, Principal Associate, GMR Group on 11th November, 2021 regarding "**Meteorological Facility at airports**".

Dr. S. D. Attri, Sc. 'G' attended the Meeting on "**GAW National Focal Point of WMO**" on 11th November, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD participated in the '**35th Annual General Meeting**' of the NWDA Society and **19th Meeting** of the Special Committee for "**Interlinking of Rivers**" chaired by the Hon'ble Union Minister for Jal Shakti at Vigyan Bhawan on 12th November, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD participated in the meeting to **discuss the time-frame to complete the action** on decision taken during the meeting chaired by Hon'ble Home Minister on 15th June, 2021 for '**flood preparedness in the country**' at North Block, New Delhi on 15th November, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD participated in the meeting of the "**South Asia Hydromet Forum III**" on 15-18 November, 2021 organized by RIMES.

Dr. Kripan Ghosh, Sc. 'F' and **Shri R. Balasubramanian**, Sc. 'E' attended meeting with ICRISAT, Hyderabad on '**upgradation of the Meghdoot App**' on 15th November, 2021 and '**Online SASCOF-21 Session**' on 25th November, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD participated in the meeting participated in the "**60th Foundation Day of IITM**" on 17th November, 2021.

Dr. M. Mohapatra, DG, IMD participated in the meeting of NDMA to "**Demonstrate application of Web-DCRA & DSS Tool - Cyclone Impact based Warning**" at NDMA Bhawan, New Delhi on 18th November, 2021.

Dr. M. Mohapatra, DG, IMD participated in the **13th Meeting of RIMES Council** on 23-24 November, 2021.

Dr. G. N. Raha, Sc. 'E' attended Aerodrome Committee Meeting on 24th November, 2021 at Tashiling Secretariat, Gangtok under the chairmanship of the **Principal Secretary**, Home Dept., Govt. of Sikkim to discuss the **contingency plan for handling Aircraft Hijack situation of Pakyong airport**.

Dr. D. S. Pai, Sc. 'G', **Dr. O. P. Sreejith**, Sc. 'E', **Dr. Satyaban Bishoi Ratna**, Sc. 'E', **Smt. Arti Bandgar**, Sc. 'C', **Dr. Sabeerali C. T.**, Sc. 'C', **Dr. Divya Surendran**, Sc. 'C' participated in the online event "**21st Session of South Asian Climate Outlook Forum (SASCOF-21)**" on 25th November, 2021.



SASCOF 21 Online Meeting

Dr. K. K. Singh, Sc. 'G', **Dr. S. K. Goroshi**, Sc. 'E', **Dr. Kripan Ghosh**, Sc. 'F' and **Smt. Priyanka Singh**, Sc. 'C' attended meeting on "**Pilot study in South Indian districts for Precipitation Forecasting**" on 26th November, 2021.

Dr. M. Mohapatra, DG, IMD participated in the "**Weather and Climate Science for Service Partnership**" India Executive Council Meeting on 6th December, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD participated in the National Organizing Committee Meeting of '**International Workshop on Monsoon (IWM-7)**' on 15th December, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD participated in the 30th Meeting of the Advisory Committee on Hindi Language on 17th December, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD participated in the '**18th Research Advisory Committee (RAC) meeting of Sameer**' on 23rd December, 2021.

Shri Sankar Nath, Sc. 'E' and **Shri Avnish Varshney**, Sc. 'D' attended a meeting with **Geospatial Delhi Limited** on 24th December, 2021 in New Delhi to **get access to their high-resolution geospatial dataset for the Delhi capital region including building footprints with their attributes, classified road networks along with traffic signals, vulnerable locations due to heavy rainfall, socio-economic dataset etc.**

Dr. S. D. Attri, Sc. 'G' attended meeting on "**Weather Commodity for trading**" held under the chairmanship of Secretary, MoES on 30th December, 2021.

LECTURES/ TALK

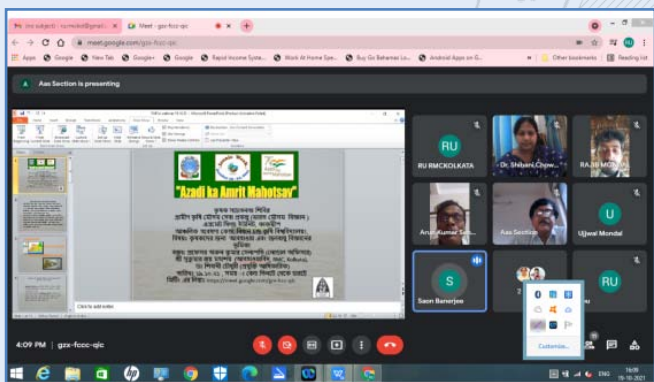
Dr. Mrutyunjay Mohapatra, DG, IMD delivered the Inaugural Address and lectures during the **Inaugural Ceremony of Tropical Cyclones Forecasters Training** organized by IMD through WebEx on 6-18 October, 2021 on **“Tropical Cyclones Monitoring & Prediction”** during the training on 8th, 11th, 14th and 18th October, 2021.

Dr. S. D. Attri, Sc. ‘G’ delivered special address on **“Geospatial for enhancing Agriculture Productivity”** in the conference on Geospatial Technologies organised by CII, New Delhi on 8th October, 2021.

Dr. K. K. Singh, Sc. ‘G’ delivered lecture on **“Agro-meteorological Services for Climate Risk Management in Agriculture”** during ‘Azadi Ka Amrit Mahotsav’ Celebrated by IMD during 18-24 October, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD delivered an invited talk **“Improvement in Early Warning System”** in the IMD’s Webinar Series during ‘Azadi Ka Amrit Mahotsav’ celebration on 19th October, 2021.

Shri S. Roy, Met. ‘A’ attended a webinar in association with Amfu Kaddwip on a topic **“Weather and Climate Sciences for the Farming community”** and delivered a lecture on 19th October, 2021.



Shri S. Roy, Met. ‘A’ delivering lecture

Dr. Mrutyunjay Mohapatra, DG, IMD participated as Guest Speaker at the **“Avert Resilient Cities”** organized by PNV Foundation, Bhubaneswar on 29th October, 2021.

Dr. S. D. Attri, Sc. ‘G’ delivered talk on **“Climate Change and Management Strategies”** as Chief Guest in Webinar organised by IDC Foundation on 14th November, 2021.

Dr. M. Mohapatra, DG, IMD chaired in the inaugural ceremony of INTROMET and delivered a talk on **‘Recent Advances in Multi-hazard Early Warning System in India’** on 23rd November, 2021. He also chaired the Panel discussion and Concluding Session on 26th November, 2021.

Dr. S. D. Attri, Sc. ‘G’ addressed the participants as Chief Guest in Symposium on **“Applications of rainwater harvesting and climate change parameters in Bundelkhand region”** organized by, P. K. University, Shivpuri on 23rd November, 2021.

Dr. M. Mohapatra, DG, IMD participated as Chief Speaker in the **‘Dharitri Youth Conclave 2021’** on the topic **“Climate Change – Focus Odisha”** on 24th November, 2021.

Dr. M. Mohapatra, DG, IMD delivered an invited lecture on **“Role of IMD for Weather Extreme Events”** in the One Week Faculty Development/ToT Programme on **‘Disaster Management’** organized by NIDM on 25th November, 2021.

Dr. M. Mohapatra, DG, IMD delivered a speech at the Session on **“Lightning Resilient India Campaign Session”** at **5th World Congress** on Disaster Management on 26th November, 2021.

Dr. M. Mohapatra, DG, IMD participated as a Special Guest in the programme **“World Soil Day”** on 5th December, 2021.

Dr. M. Mohapatra, DG, IMD addressed the Plenary Session on **“Climate Change and Water connect”** under International Water Innovation Summit organized by Confederation of Indian Industry (CII) under the theme **“Jal Andolan : From a Reactive to Proactive Approach for a better Tomorrow”** on 6th December, 2021.

Dr. M. Mohapatra, DG, IMD participated as a Panelist in the Session on **“Causes of Global Warming & Climate Change (GW&CC), its Remedies, and how to cope with the effects of GW&CC”** organized by International forum of Meteorological Societies, Canada on 8th December, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD and **Dr. Naresh Kumar**, Sc. ‘E’ participated in the meeting under Chairmanship of Member Secretary, NDMA with concerned Ministries and States prone to Cold Wave to review the **preparedness and mitigation measures for Cold Wave season 2021-22** through VC on 8th December, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD chaired the session on **“Atmosphere”** in the International Symposium **“India Geoscience and Remote Sensing Symposium (INGARSS)-2021”** organised by Indian Space Research Organisation on 9th December, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD delivered a lecture on **“Flood & Cyclone Forecasting and Warning System in India”** in the three days e-ITEC Training Course on **“Disaster Risk Reduction and Management”** organized by Haryana Institute of Public Administration on 10th December, 2021.

Dr. Mrutyunjay Mohapatra, DG, IMD participated in the **‘Part 1 of the Regional Association (RA II) Training Workshop’** on the **“Checklist for Climate Services Implementation”** on 16th December, 2021.

Dr. S. D. Attri, Sc. ‘G’ delivered invited talk on **“Climate Change and Management Strategies”** in International Conference on **“Climate Change-An Imminent Global Emergency 2021”** on 18th December, 2021 at JHC, New Delhi.

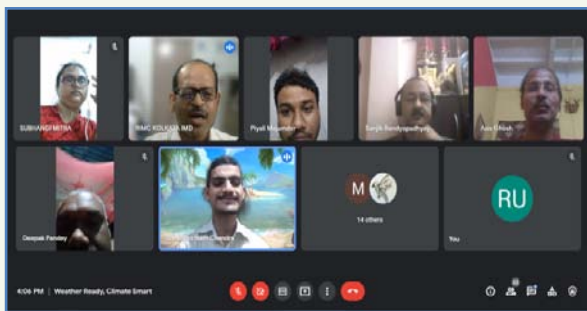
Dr. Mrutyunjay Mohapatra, DG, IMD delivered a lecture on **“Hydro-meteorological Risks Reduction and Resilience”** at NIDM on 21st December, 2021.

Dr. M. Mohapatra, DG, IMD delivered a lecture on **“Climate Change & Cyclones-Increased Vulnerability along the coasts”** during the training programme organized by Lal Bahadur Shastri National Academy of Administration on 24th December, 2021.

Shri R. Balasubramanian, Sc. ‘E’ delivered a lecture on **“Southwest Monsoon 2021 and Activities under GKMS in Maharashtra”** in ‘49th Joint Agressco-2021’ organized by VNMKV, Parbhani, Maharashtra on 24th December, 2021.

WEBINAR

Dr. Sanjib Bandyopadhyay, Sc. ‘F’ attended a webinar in association with **Indian Institute Of Cerebral Palsy, Kolkata** and delivered an interactive type lecture to the special students on **“Weather- ready, Climate-smart”** on 24th October, 2021.



Dr. Sanjib Bandyopadhyay, Sc. ‘F’ delivering the lecture

Dr. M. Mohapatra, DG, IMD participated in the Webinar on **“Disaster Risk & Building Resilience : Compassion & Love”** addressed by His Holiness, Dalai Lama on 15th November, 2021.



Dr. M. Mohapatra, DG, IMD and His Holiness, Dalai Lama

Shri Amul Batra, Sc. ‘E’ conducted seminar on **“Use of IOT devices & sensors for effective now-casting and impact based forecasting in a broad spectrum of domains”** and on **‘Use of Drones for Upper Air Observations and Stratosphere navigation’** on 17th November, 2021.

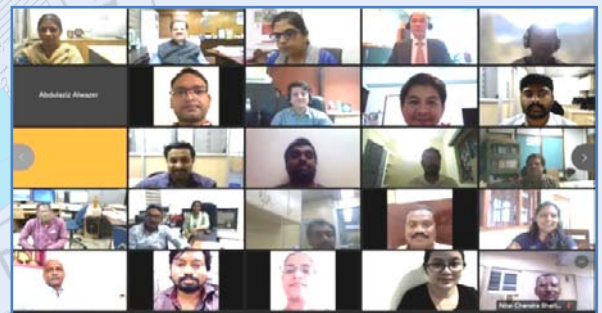
Shri Raja Acharya, Met. ‘A’ participated in the webinar on **“Innovation and Cutting-edge Activities in Space-borne Precipitation Measurements and Application”** organized by the WMO, on 14th December, 2021.

TRAININGS

TROPICAL CYCLONES FORECASTERS TRAINING

India Meteorological Department (IMD) is one of six Regional Specialised Meteorological Centres (RSMCs) in the world

recognised by the World Meteorological Organisation (WMO) under a global system for issue of warnings and advisories in association with cyclonic disturbances over north Indian Ocean to 13 WMO/ Economic and Social Commission for Asia and Pacific (ESCAP) Panel member countries. In addition, IMD also conducts training for cyclone forecasters in the region annually as part of capacity building measure. IMD started conducting tropical cyclones forecasters training since 2005. This year, the WMO’s Tropical Cyclones Forecasters Training 2021 was conducted by RSMC, New Delhi during 06-18 October, 2021 through Web-Ex. This was the 17th such training programme for the cyclone forecasters of the member countries. There were 56 participants including 22 International participants from Thailand, Myanmar, Sri Lanka, Maldives, Pakistan, Iran, Oman, Yemen, Saudi Arabia, and 34 participants from various sub-offices of IMD. The training was aimed at building capacity of the TC forecasters in the region by understanding the latest developments in observations, monitoring, modeling, prediction and early warning services of TCs over the Bay of Bengal and the Arabian Sea and carrying out the case studies as practical examples in these aspects. Two days of the training schedule included Storm surge & wave forecasting. The training included resource persons from UN-ESCAP, RSMC Tokyo, IMD, National Centre for Medium Range Weather Forecasting (NCMRWF) and Indian National Centre for Ocean Information Services (INCOIS). On the last day of training on 18th October, internal assessment of participants was carried out followed by the ceremonial Valedictory Ceremony and distribution of certificates.



Dr. M. Mohapatra, DG, IMD and others during training

Dr. M. Mohapatra, DG, IMD chaired the inaugural ceremony of **‘AWS, ARG and Surface Instrument Maintenance Training’** on 25th November, 2021 organized by Regional Meteorological Centre, New Delhi.

OUTREACH PROGRAMME

Shri Amul Batra, Sc. ‘E’ was associated in **‘Critical Design review’** and **‘acceptance of make in India radio sounder’** for balloon launched upper air observations on 28th October, 2021.

During October to December **511 Farmers awareness programmes (FAPs)** were organized by Agromet Field Units and District Agromet Units across the country.

PANEX-21 -MULTI-AGENCY EXERCISE FOR DISASTER RESPONSE

IMD Participated in the **‘PANEX-21’** -multi-agency exercise for Disaster Response conducted by the College of Military

Engineering (CME) for **BIMSTEC countries** on 21st December, 2021. **The role of IMD** was to showcase the capability of the India Meteorological Department in observing and forecasting disastrous weather events including earthquakes and how the IMD contributes to disaster rescue operations. IMD was part of the emergency operation center (EOC) of the Indian Army, which consisted of experts from CWC, NRSC, NDRF, and the Army Control Room. IMD Team described the capability of IMD in forecasting severe weather events with a live demonstration of the data of AWS and seismic sensor. Posters about the early warning system and disaster management system in IMD were also displayed.

NOMINATIONS

Dr. K. K. Singh, Sc. 'G' and **Dr. S. D. Attri**, Sc. 'G' have been nominated as member of two committees of MoES to support **World Hindi Day** on 10th January, 2022 **International Mother Language Day** on 21st February, 2022.

APPRECIATIONS RECEIVED

IMD received appreciation from **Shri Rajeev Singhal**, General manager, **Oil & Natural Gas Corporation** for '**frequent and accurate updates on cyclone Shaheen over Arabian Sea**' that helped in boosting the confidence of top management and also the morale of personnel working off shore. The excerpt of appreciation received is given below:



Dr. M. Mohapatra, DG, IMD received appreciation from **Petteri Taalas**, Secretary General of World Meteorological Organisation for organising the '**Tropical cyclones forecasters training**' and for dedicated lectures during the training. The excerpt of appreciation received is given:



PNV Group conferred "**6th Edition of Showcase Odisha Award**" upon **Dr. Mrutyunjay Mohapatra**, DG, IMD on 10th October, 2021 for his **exemplary services in improvement of cyclone warning services of IMD** that helped in significant reduction of death toll over India and WMO/ESCAP Panel member countries.



Dr. Mrutyunjay Mohapatra, DG, IMD being conferred by PNV Group

Infrastructure Development & Installations

The **Climate Data Service Portal** has been upgraded to **Version 1.2** with the URL <https://cdsp.imdpune.gov.in/>, with added facility of '**Daily Report of Extremes and Climate Information**' Page. The hardware comprising two servers, NAS storage and smart-rack amounting to Rs. 89.198 Lakhs has been procured and installed.

Road Map for Installation of **Automatic Weather Stations (AWS)** and **Automatic Rain Gauge (ARG)** in the country under the scheme "**ACROSS (Atmosphere and Climate Research, Observations Science Services) SCHEME**" for the year 2021-2026 submitted to IMD Records.

Installations of **DCWIS system** on 10 metre frangible mast at different airports are undertaken.

28 Agro AWS's have been installed at various District Agromet Field Units (DAMUs) during the quarter.

DCWIS system was installed during October, 2021 at Dehradun, November, 2021 at Indira Gandhi International Airport (IGI), New Delhi RWY11 (DCWI Swith PWD), Devgarh airport and December, 2021 at Rupsi airport, Diu.

Inter-Agency Meetings

Dr. D. S. Pai, Sc. 'G', **Dr. O. P. Sreejith**, Sc. 'E', **Dr. Pulak Guhathakurta**, Sc. 'F' **Dr. Sreejith O. P.**, Sc. 'E' and **Dr. Rajib Chattopadhyay**, Sc. 'E' attended online meetings with **UNESCAP (United Nations Economic and Social Commission for Asia)** regarding the '**preparation of Climate impact forecasts for various user sectors using the Climate outlook**' of the CRS office on 8th October, 2021.

Dr. Kripan Ghosh, Sc. 'F', **Shri R. Balasubramanian**, Sc. 'E' and **Dr. Asha Latwal**, Sc. 'C' attended the Meeting to "**discuss integration of advisory module between IMD and DoA applications**" organised by Maharashtra Agriculture Department on 13th October, 2021.

Dr. D. S. Pai, Sc. 'G' and Dr. O. P. Sreejith, Sc. 'E' attended an online meeting conducted by 'WMO Launch Event for State of the Climate for Asia 2020' on 26th October, 2021.

Dr. S. D. Attri, Sc. 'G' chaired the meeting of 'TEC-48000 GPS Radiosondes-GUAN' on 2nd November, 2021.

Dr. S. D. Attri, Sc. 'G' chaired the '118th Meeting of the Library Advisory Committee' on 17th November, 2021.

Dr. S. D. Attri, Sc. 'G' visited Shimla and held discussion with Advocate General of Govt. of HP, Shimla and ASGI Shimla in connection with court case at High Court during 24-26 November, 2021.

Dr. Somnath Dutta, Sc. 'F' as a member of the International Advisory Committee & Chairman of Working Group for RA-II attended online 'WMO SYMET-14' on 24th November, 2021.

Dr. Ranjeet Singh, Sc. 'F' participated and provided inputs to 'Crop Weather Watch Group (CWWG) Meeting' held on 17th, 24th and 31st December, 2021, co-ordinated by Ministry of Agriculture, Cooperation & Farmer Welfare, New Delhi.

Dr. Kripan Ghosh, Sc. 'F' and Shri R. Balasubramanian, Sc. 'E' participated in '49th Joint Agresco-2021' organized by VNMKV, Parbhani, Maharashtra on 24th December, 2021.

Shri R. Balasubramanian, Sc. 'E' and Dr. Ashutosh Kumar Misra, Sc. 'D' attended the "Project Sanctioned and Steering Committee Meeting" of National Adaptation Fund for Climate Change (NAFCC) chaired by Commissioner Agriculture, Maharashtra State on 28th December, 2021.

Dr. H. R. Biswas, Sc. 'E' attended the "Crop Weather Watch Group Committee Meeting for Rabi – 2021" under the chairmanship of Agriculture Production Commissioner, Govt. of Odisha, on virtual mode through Microsoft Teams on 29th November, 2021.

Research & Publications

Eighteen (18) research articles have been published in **MAUSAM** (Vol. 72, No. 4), October issue.

The book entitled "Climate Resilience and Environmental Sustainability Approaches - Global Lessons and Local Challenges" by Anubha Kaushik, C. P. Kaushik and S. D. Attri and published by Springer Nature was released by Dr. M. Ravichandran, Secretary, Ministry of Earth Sciences in the august presence of Dr. M. Mohapatra, DGM, IMD on 20th October, 2021 in Ministry of Earth Sciences, New Delhi.



Akshara Kaginalkar, A., Sachin Ghude, S., Mohanty, U.C., Mujumdar, P., Attri, S. D. and Niyogi, D., 2021, "Integrated urban environmental system of systems for weather ready cities in India", Bulletin of the American Meteorological Society, doi.org/10.1175/BAMS-D-20-0279.

Deep Karan Singh, Ramashray Yadav, K. C. Sai Krishnan and Lt. Cdr Nisha Rawat, 2021 "Analysis of three unusual severe weather events over Delhi during May-June, 2018 using Dual-Pol Doppler Weather Radar and GNSS data", MAUSAM, 72, 4, 719-738, https://doi.org/10.54302/mausam.v72i4.3543.

Ranjan Phukan, Rakesh Kumar, M. Chanda, Rana Das and D. Saha, 2021 "A synoptic and thermodynamic analysis for forecasting of squalls at Agartala", MAUSAM, 72, 4, 791-802, https://doi.org/10.54302/mausam.v72i4.3547.

P. R. Naskar, S. Katiyar and S. Bondyopadhyay, 2021 "Pre-monsoon and post-monsoon groundwater chemical analysis For Burdwan (West Bengal), India", MAUSAM, 72, 4, 859-864, https://doi.org/10.54302/mausam.v72i4.3553.

Sunny Chug, Sankar Nath, Kuldeep Srivastava and S. L. Singh, 2021 "Recent advances in communication infrastructure of IMD for early warning system", MAUSAM, 72, 4, 935-946, https://doi.org/10.54302/mausam.v72i4.3559.

Kaushik, Anubha, Attri, S. D., Kaushik, C. P. and Schnell, Russ, 2021, "Climate Resilience and Environmental Sustainability Approaches: An Introduction, In : Climate Resilience and Environmental Sustainability Approaches - Global Lessons and local Challenges", Springer Nature, 1-8, https://doi.org/10.1007/978-981-16-0902-2.

Dr. Mrutyunjay Mohapatra, DG, IMD published an article on "Recent Advances in Early Warning Services of India Meteorological Department" in IMD Blog on 19th October, 2021. The same is available at link https://imdweather1875.wordpress.com/2021/10/19/recent-advances-in-early-warning-services-of-india-meteorological-department/#more-426.

Sahadat Sarkar, P. Mukhopadhyay, R. Phani Murali Krishna and Somenath Dutta, 2021, "Atmospheric dynamics and internal processes in CFSv2 model during organization and intensification of BSISO", Journal of Earth System Science, 130.

Sahadat Sarkar, P. Mukhopadhyay, R. Phani Murali Krishna and Somenath Dutta, 2021, "Energy conversion processes associated with the transition of the low pressure area to monsoon depression during Indian summer monsoon: a study to evaluate GFS model fidelity", Meteorology and Atmospheric Physics (published online).

Praveen K. Thakur, Elena Shevnina and Suvrat Kaushik, Atul Verma, Yogesh Ray, S. P. Aggarwal, 2021, "Meteorological parameters and water balance components of Priyadarshini Lake at the Schirmacher Oasis, East Antarctica", Polar Science, 30, 10076-10076, 10.1016/j.polar.2021.100763.

Rizwan Ahmed, Mohapatra, M, Ram Kumar Giri and Suneet Dwivedi, 2021, "An Evaluation of Advanced Dvorak Technique

(9.0) for the tropical cyclones over the North Indian Ocean”, *Tropical cyclone Research & Review*, **10**, 4, 207-214.

B. L. Sudeepkumar, C. A. Babu and Hamza Varikoden, 2021, “Thermodynamic structure of monsoon boundary layer over the west coast of India”, *Atmospheric Research*, **261**, 1-16, <https://doi.org/10.1016/j.atmosres.2021.105748>.

M. T. Bushair, S. Indira Rani, Gibies George, Sushant Kumar, Sumit Kumar and John. P. George, 2021, “Role of Space-Borne Sea Surface Winds on the Simulation of Tropical Cyclones Over the Indian Seas”, *Pure and Applied Geophysics*, **11**, 1, 1-11, <https://doi.org/10.1007/s00704-021-03833-4>.

Susmita Ekka, Sanjat Kumar Sahu, Sanjeev Dwivedi, Sanjenbam Nirmala Khuman, Shirsendu Das, Omkar Gaonkar and Paromita Chakraborty, 2021, “Seasonality, atmospheric transport and inhalation risk assessment of polycyclic aromatic hydrocarbons in PM_{2.5} and PM₁₀ from industrial belts of Odisha, India”, *Environmental Geochemistry and Health*, 2021, <https://doi.org/10.1007/s10653-021-01128-1>.

Tapajyoti Chakraborty, Sandeep Pattnaik, Vijay Vishwakarma, and Himadri Baisya, 2021, “Spatio-Temporal Variability of Pre-monsoon Convective Events and Associated Rainfall over the State of Odisha (India) in the Recent Decade”, *Pure and Applied Geophysics*, **0**, 1-17, <https://doi.org/10.1007/s00024-021-02886-w>.

B. L. Sudeep kumar, C. A. Babu and Hamza Varikoden, 2021, “Variations in monsoon boundary layer structure with respect to cloudiness over the west coast of India”, *Meteorology and Atmospheric Physics*, **134**, <https://doi.org/10.1007/s00703-021-00839-5>.

Pulak Guhathakurta, Ram Rattan, Rajib Chattopadhyay, Lalit. S. Bile, Deepa Kulkarni and Ashwini Kumar Prasad, 2021 “Prediction of Monthly malaria outbreaks in districts of Odisha, India with Meteorological Parameters using statistical and Artificial Neural Network Techniques”, *Climate Health*, **1**, 3, 126-140.

Sravani Alanka and Lakshmana Rao Vennapu, 2021, “Variability of potential Evapotranspiration and moisture conditions in Srikakulam district of Andhra Pradesh”, *Journal of Agrometeorology*, **23**, 4, 423-427, <https://doi.org/10.54386/jam.v23i4.147>.

Shri Sudeep Kumar, B. L., 2021, "Thermodynamic Structure of Atmospheric Boundary Layer over the West Coast of India During the Southwest Monsoon", Poster, 'AGU Fall Meeting 2021', New Orleans, USA.

Media Interaction

All India radio and DD Kisan broadcasted Special Interview of Dr. Mrutyunjay Mohapatra, DG, IMD on the evening of 'Azadi ka Amrit Mahostav' celebrations by IMD on 17th October, 2021.

Engage Embrace Enrich, Correspondent, Asian Media Group, interviewed Dr. Mrutyunjay Mohapatra, DG, IMD on the monsoon season 2021 on 30th October, 2021.

Dr. S. Balachandran, Sc. 'F' gave talk, in Tamil, in the All India Radio, Chennai on “Evolution of Indian Meteorological services during the past 75 years” on 23rd October, 2021 as a part of “Science for Society” programme on the occasion of celebration of 'Azadi Ka Amrit Mahotsav' Iconic Week during 18-24 October, 2021.

இந்திய அரசு
இந்திய வானிலை ஆய்வு துறை
மண்டல வானிலை ஆய்வு மையம்
6, கல்லூரி சாலை, சென்னை - 600 006

75
Azadi Ka
Amrit Mahotsav

Iconic Week
October 18 - 24, 2021

Science for Society

AIR Talk
By Dr.S. Balachandran, Scientist-F & Head
RMC Chennai

Programme	அனைவருக்கும் அறிவியல் - Interview with Dr.S.Balachandran, DDGM, RMC Chennai
Title	இந்திய வானிலை துறையில் கடந்த 75 வருடகால வளர்ச்சி
Date & Time	23-10-2021; 09:00 pm
Broadcast details	Channel-A (720 kHz AM)

India Meteorological Department,
Regional Meteorological Centre, Chennai

Shri C. S. Patil, Sc. 'D' delivered talk on services of IMD on AIR during 'Azadi Ka Amrit Mahotsav' on 25th October, 2021.

Visitors

23 (Twenty-three) army officers from faculty of CBRN Protection, College of Military Engineering (CME), Khadki visited CAgMo, Pune on 12th November, 2021.



Shri Atul Karwal, DG, NDRF visited IMD on 22nd November, 2021