

## Ministry of Earth Sciences (MoES)

### Summary of Important Developments – November, 2022

- 1. Important policy decisions taken and major achievements during the month:** Provided in Annex I.
- 2. Important policy matters held up on account of prolonged Inter- Ministerial consultations:** Nil
- 3. No. of cases of ‘sanction for prosecution’ pending for more than three months:** Nil
- 4. Particulars of cases in which there has been a departure from the Transaction of Business Rules or established policy of the Government:** Nil
- 5. Status of ongoing Swachhta Abhiyan (progress under Special Campaign):** Routine cleaning of the campus.
- 6. Status of Rationalization of Autonomous Bodies:** The Cabinet in its meeting on 13<sup>th</sup> July 2022 approved the merging of 5 Autonomous Bodies under MoES to one Autonomous Body.
- 7. Information on specific steps taken for utilization of the Space Technology based tools and applications in Governance and Development:** Potential Fishing Zone advisories are generated using the satellite derived parameters viz., Sea Surface Temperature, and Chlorophyll. Further, data from Global satellite data are used on continuous basis for generating short range and medium range weather forecasts.
- 8. Vacancy position of senior level appointments in the Ministry/ Department, including Autonomous Bodies/ PSUs:** It is confirmed that the incumbency details of all the posts in the Ministry/Department and its organizations falling under the purview of the ACC have been updated on AVMS and are placed at Annex-II.
- 9. List of cases in which ACC (Appointments Committee of Cabinet) directions have not been compiled with:** It is confirmed that the directions of ACC are complied with.
- 10. Details of FDI Proposals cleared during the month and status of FDI proposals awaiting approval in the Ministry/ Department:** Not Applicable.

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### Important policy decision taken and major achievements:

- The Search And Rescue Aid Tool-Integrated (SARAT-I) developed by Indian National Centre for Ocean Information Services (INCOIS) inaugurated by Director General, Indian Coast Guard during the 20<sup>th</sup> National Maritime Search & Rescue (NMSAR) Board meeting, Gujarat on 18<sup>th</sup> November 2022.
- A new version of DAMINI- Mobile App for Lightning alerts has been released during Indian Institute of Tropical Meteorology (IITM) Diamond Jubilee Foundation day celebrations on 17<sup>th</sup> November 2022. This upgraded version allows user to receive warning in any one of the 15 languages (English, Hindi, Assame, Bengali, Gujarati, Kashmiri, Kannada, Konkani, Malayalam, Marathi, Oriya, Punjabi, Tamil, Telugu and Urdu).
- IITM high-resolution global forecast Model (HGFM) was inaugurated on the 60<sup>th</sup> foundation day of IITM on 17<sup>th</sup> November 2022. This "Make in India" Model has been run in real-time daily since June 2022 on an experimental basis. After a thorough validation and performance evaluation, the model will be handed over for operational implementation to India Meteorological Department. A dedicated website <https://srf.tropmet.res.in/srf/hgfm/> for high resolution global forecast Model (HGFM) was launched on this occasion.
- Fog observatory was set up for the fog campaign at New Delhi airport site during 27 October to 25 November 2022 by IITM, Pune.
- IITM celebrated its Diamond Jubilee Foundation Day (60<sup>th</sup> Anniversary) on 17<sup>th</sup> November 2022.
- Thirty five members of 42- Indian Scientific Expedition to Antarctica (ISEA) commenced their onward journey to Antarctica via Cape Town.
- The Technology of Saline Water Lantern and Sea surface temperature sensor was transferred to M/s.Printlay Technologies and M/s. Tridel Technologies by National Institute of Ocean Technology (NIOT).
- During the upcoming winter season (December 2022 to February 2023), below normal minimum temperatures are most likely over many parts of peninsular India and some parts of central India and isolated parts of northwest India.
- Monthly rainfall for December 2022 over the South Peninsular India consisting of five meteorological subdivisions (Tamil Nadu, Puducherry & Karaikal, Coastal Andhra Pradesh & Yanam, Rayalaseema, Kerala & Mahe and South Interior Karnataka) is most likely to be normal (69-131% of Long Period Average (LPA)). Monthly rainfall over the country as a whole during December 2022 is most likely to be below normal (< 71 % of Long Period Average (LPA)).
- New Building of Meteorological Center Lucknow was inaugurated on 31-10-2022 by Chief Guest Smt. Anandi Ben Patel, Hon'ble Governor of Uttar Pradesh.
- The Centre for Marine Living Resources and Ecology (CMLRE) has collected a cranium from Valappad Beach, Thrissur, and has been identified as cranium of great Blue whale (Length: 185 cm; wt: 250- 300 approx.) The specimen will be kept in CMLRE museum after the completion of required procedures with the Department of Forest, Govt of Kerala.

- India Meteorological Department (IMD) signed a Memorandum of Understanding with Sambalpur University to enhance research & development activities between the two organizations.
- A Memorandum of Understanding (MoU) on project ‘ANUMAAN’ was signed between National Centre for Medium Range Weather Forecasting (NCMRWF) and Indian Army for data sharing and Research & Development work. It will enable real time exploitation of advanced numerical weather prediction system and models by the Indian Army.

There was no matter pending before the Cabinet requiring decision/approval.

**Minimum Government, Maximum Governance:**

- Dissemination of Agromet Advisories to user communities through SMS and IVR technology is continued in the country through Kisan Portal and under PPP (Public Private Partnership) mode. Presently, about 7.6 million farmers in the country are getting advisories directly.
- Adverse-weather SMS warnings are being sent through mobile to the State Government officials / Disaster-related officials / Central Government organizations/common man.
- Daily forecast along with warning and city forecast for many cities are disseminated through email to all users including state authorities, electronic and print media.

**Atmospheric Observation Systems Network**

<b>Observation Type</b>	<b>Commissioned so far</b>	<b>Installations during the month</b>	<b>Data Reporting</b>
Automatic Weather Station (AWS)	*461 (807-346)	1	461
Automatic Rain Gauge (ARG)	532** (1382-850)	--	532
Agro AWS	200	--	191
GPS Sonde based RS/RW (Radio Sonde/ Radio Wind Stations)	56	--	56
Doppler Weather Radar (DWR)	*** 37	--	32
Ozone (Ozone Sonde + Total Ozone)	02	--	02
Surface Ozone (Electrochemical Concentration Cell method)	07	--	05
Nephelometer	12	--	09
Sky Radiometer	20	--	16
Black Carbon Monitoring Systems (Aethalometer)	25	--	15
System of Air Quality Monitoring System (SAFAR)	10 (Delhi) 10 (Mumbai) 10(Ahmedabad)	--	09(Delhi) NIL(Mumbai)***** NIL(Ahmedabad)

Hydromet (Indian Meteorological Department (IMD)& Extra-departmental excluding AWS &ARG)	---	--	3087
Aviation	79	--	79
Radiation Stations	46	---	46

\* Out of Total 807, 346 are outlived.

\*\* Out of total 1382, 850 are outlived.

\*\*\* Including 2 Doppler Weather Radar of Indian Space Research Organization (ISRO).

\*\*\*\* Contract with the firm is not renewed.

## Modelling

During November 2022, every week on Thursdays, National Centre for Medium Range Weather Forecasting (NCMRWF) coupled model based Extended Range Prediction (ERP) for four weeks for rainfall, surface temperature and winds (full fields and anomalies) were provided in real-time to (i) Long-range forecast and Agri-Met divisions of IMD, (ii) Indian Institute Of Tropical Meteorology (IITM) ERP group, (iii) Space Applications Centre (SAC), (iv) Defence Geo-informatics Research Establishment (DGRE), (v) Indian Air Force (IAF), (vi) Navy, (vii) Geological Survey of India (GSI), (viii) National Institute of Hydrology (NIH), (ix) All regional centres of IMD and (x) Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) countries Met Departments. Additionally, snow forecasts were provided to Defence Research and Development Organisation (DRDO) and IAF for use at their end. On the last Thursday of the month, i.e., on 24<sup>th</sup> Nov 2022 the monthly mean forecast valid for December 2022 were also included for the users.

## Monthly Weather Summary (November 2022)

### a) Important Weather Events during the month

#### Low Pressure Systems:

A Well-Marked Low-Pressure area formed over Southwest Bay of Bengal and moved over to Southeast Arabian Sea across northeast Sri Lanka, north Tamil Nadu and Kerala during 9-14 Nov 2022. It caused extremely heavy rainfall over Delta District of TN on 11-12 Nov 2022.

Five Western Disturbances (WD) moved across north India during the month. Out of these, two WDs (during 2-5 and 6-9 Nov) impacted north India and caused isolated to scattered rainfall/snowfall over Western Himalayan region and rainfall over adjoining plains. Rest three WDs were feeble (13-15, 18-21 and 22-24 Nov) and did not cause much weather.

Shallow to moderate fog reported over isolated pockets of East Uttar Pradesh, Bihar, Delhi during last week of Nov.

**b) Rainfall Scenario:** The rainfall for the country as a whole, for the month of November-2022 has been recorded as 18.7 mm which is 63% of its Long Period Average (LPA) of 29.7 mm.

### c) Heavy Rainfall Events:

<b>Warning issued for</b>	<b>No. of Heavy/Very Heavy Rainfall Events (&gt;64.4 mm): 330</b>
	<b>Percentage correct (in %) for Rainfall &gt;64.4mm</b>
Day1 / 24 Hours	97

Day2 / 48 Hours	97
Day3 / 72 Hours	97

**d) Temperature Scenario:** The mean temperature for the month of November-2022 for the country as a whole was 23.56<sup>0</sup>C which was above normal by +0.34<sup>0</sup>C. The maximum temperature of 39.6<sup>0</sup>C had been recorded at Kandla Airport (Saurashtra & Kutch) on 4th November 2022 and the minimum temperature of 4.1<sup>0</sup>C had been recorded at Churu (West Rajasthan) on 24th November 2022 over the plains of the country during the month.

**e) Thunder squall & Hailstorm activity:** Thunder squall & Hailstorm activity during the month (till 0830 IST of last date of the month) is given in the table below:

S. No.	Region	TS Days	Hail Events	Squall Events	Dust storms
1.	South Peninsular India	19	Nil	Nil	Nil
2.	Northwest India	08	Nil	Nil	1 {on 8 November-Sikar }
3.	Northeast India	03	Nil	Nil	Nil
4.	East India	02	Nil	Nil	Nil
5.	Central India	0	Nil	Nil	Nil
6.	West India	01	Nil	Nil	Nil

#### **Bulletins/Warnings/Press Releases Issued:**

All India Weather Bulletins:- 120, All India inference and severe weather warnings:- 120, All India Weekly Weather Reports:- 4, Daily guidance under Tropical Cyclone Forecasting Programme: 30, Extended Range Outlook for cyclogenesis:- 4, Tropical weather outlook:- 27, Special tropical weather outlook:- 12, Mountain weather bulletins issued for western and central Himalayan region:- 60, Marine Weather Bulletins:- 60, Severe weather guidance for next 5 days about heavy rain, strong winds, high waves & storm surge: 30, Nowcast Guidance Bulletins for Severe Weather:- 30, Press Releases issued during the month:- 40.

#### **Publications & Operational Reports:**

1. Bulletin for May, June, Winter Season, Pre-Monsoon Season 2022 has been published and uploaded on the website.
2. Computed gridded Standardized Precipitation Index (SPI) & Standard Precipitation Evaporation Index (SPEI) at 0.5\*0.5 degree resolution at 4 weekly, 1, 2, 3, & 4 monthly time scales. Uploaded the maps of the aforementioned timescales at weekly basis on IMD Pune website.
3. Monthly and cumulative SPI maps were prepared for the month ending October 2022 for use in Climate Diagnostic Bulletin of India. The same have also been uploaded in IMD Pune website.
4. Four weekly and cumulative SPI maps were prepared for the weeks ending 02.11.2022, 09.11.2022, 16.11.2022, 23.11.2022 and 30.11.2022 and supplied for use in Agromet Advisory Services Bulletin. The same have also been uploaded in IMD Pune website.
5. Four weekly Aridity Anomaly Maps for the period 27 October to 02 November, 03 to 09, 10 to 16 and 17 to 23 November 2022 have been prepared and uploaded on IMD Website and mailed to Agrimet for Agromet Advisory Services.
6. Four Biweekly Aridity Anomaly Maps for the period 20 October to 02 November, 27 October to 09 November, 03 to 16 and 10 to 23 November 2022 have been prepared and uploaded on IMD Website.

7. Four weekly Aridity Anomaly Outlook Maps for the period 03 to 09, 10 to 16, 17 to 23 and 24 to 30 November 2022 have been prepared and uploaded on IMD Website.
8. Monthly Aridity Anomaly Maps for the period October 2022 have been prepared and uploaded on IMD Web-site.

### **Seismological Observational Network**

<b>Observation Type</b>	<b>Target</b>	<b>Commissioned so far</b>	<b>Data reporting during the month</b>
Seismic stations	115	152	130

### **Earthquake and Tsunami monitoring**

**Earthquake:** 106 earthquakes were monitored in the Indian region out of which 4 events were greater than the magnitude (M) of 5.0.

**Tsunami:** 4 seabed earthquakes (M>6) with a potential to generate tsunami have occurred. These informations were provided in less than 12 minutes of occurrence of the events.

### **Ocean Observation System**

<b>Type of Platform</b>	<b>Target</b>	<b>Commissioned till November, 2022</b>	<b>Data received during November, 2022</b>
Argo Floats *	200	374	57
Moored Buoys	16	19	9
Tide Gauges	36	36	32
High Frequency (HF) Radars	10	12	9
Acoustic Doppler Current Profiler (ADCP)	20	20	17
Tsunami Buoys	4	7	3
Wave Rider Buoy	23	16	12

\*The remaining floats/drifters have completed their life time and as such no data can be received from them.

### **Ocean Science Services**

<b>No</b>	<b>Types of forecasts</b>	<b>No. of advisories issued during the month</b>
1.	Integrated Potential Fishing Zone (PFZ) advisories (Sea Surface Temperature (SST), Chlorophyll., wind)	31
2.	Tuna Fishing Advisories	3
3.	Ocean State Forecast (OSF)-Wave, Wind, Currents, SST (Sea Surface Temperature), MLD (Mixed Layer Depth) and D20 forecasts	30
4.	Real time global ocean analysis (daily)	31
5.	Coral Bleaching Alert System	10

### **Outreach and Awareness**

- INCOIS organized a National Tsunami Standard Operating Procedure (SOP) workshop from 31 October – 03 November 2022 at INCOIS, Hyderabad. A total of 22 members attended workshops from various coastal states/ Union Territories of India.

- As part of the 7th World Tsunami Awareness Day (WTAD) on 5 November 2022, INCOIS conducted a mock tsunami drill in coordination with Odisha, five coastal communities including two Intergovernmental Oceanographic Commission - United Nations Educational, Scientific and Cultural Organization (IOC-UNESCO) Tsunami Ready communities.
- International Training Centre for Operational Oceanography (ITCOcean) - INCOIS & Andhra University, Visakhapatnam with the support of Partnership for Observation of the Global Ocean (POGO) organized an International training course on "Ocean Observations to Societal Applications " conducted from 31 October - 05 November 2022. Eight (8) foreign nationals (Bangladesh, Indonesia, Maldives, Mozambique, South Korea, Sri Lanka, and Tanzania) and fifteen (15) trainees from India have participated in the training course.
- INCOIS organized a one-day Oceanographers Conference on “Ocean Observation, Modelling, Information, and Advisory Services to support Blue Economy” under the Colombo Security Conclave (CSC) pillar of “Maritime Safety and Security” on 18 November 2022 at Hyderabad, India.
- Students from various schools & colleges visited the INCOIS and NCMRWF campus.
- A delegation comprising of scientist/engineers/officers from Bangladesh Met Dept. (BMD), Bangladesh Water Development Board (BWDB) and Dept. of Agr. Extension (DAE), Bangladesh visited NCMRWF on an education tour to discuss on how NCMRWF produces model-based weather forecasts for application in water, Agriculture and other sectors.
- MoES and its institutes observed the “Vigilance Awareness Week” during 31.10.2022 to 06.11.2022 under the theme “Corruption free India for a Developed Nation”.
- MoES and its institutes celebrated the Constitution Day on 26 November 2022.
- Doctors from Indian Council of Medical Research (ICMR) visited NCMRWF for training on weather forecasting/ Meteorology. They were presented on the activities at NCMRWF with presentations and they were also given a guided tour of the Super-Computing facilities at NCMRWF.
- A Special Lecture Series on Atmospheric/Monsoon Dynamics was arranged on the specific topics: 1) Discovery of Neutral Rossby Waves, 2) Necessity of Instability Theories, 3) Breaks in Monsoons on November 14, 16 & 18, 2022. It was also telecasted on YouTube channel by IITM, Pune.
- The 29<sup>th</sup> Foundation of Day of NIOT along with the 25<sup>th</sup> year foundation of the Ocean Observation Systems erstwhile National Data Buoy Programme was celebrated on 14<sup>th</sup> November 2022 at NIOT, Chennai.
- India Meteorological Department (IMD) organized Press Conference on “Outlook for rainfall and temperature for the month of November, 2022” on 1st November 2022.
- IMD issued daily weather forecasting video of about 5 minutes duration in English & Hindi through YouTube, Facebook, Twitter and IMD website.
- Weekly video on extended range forecast (upto two weeks) were issued every Thursday through website and social media (Facebook, Twitter, YouTube etc.).
- Daily interviewed was provided by the forecasters within the country.
- The forecast videos in regional language were issued by regional offices of IMD regularly.
- Bulletins and Warnings along with graphics were also communicated through Social Media including Facebook, Twitter, Instagram, YouTube and IMD Blog page.

## Publications

Subject	Publications			Ph.Ds		
	April, 2022 – October, 2022	November, 2022	Total	April, 2022 – October, 2022	November, 2022	Total
Atmospheric Sciences	98	18	116	13	-	13
Ocean Science and Technology	50	8	58	2	2	4
Polar Sciences	20	-	20	-	-	-
Geosciences and resources	39	1	40	1	-	1
Total	207	27	234	16	2	18

## Utilization of Ocean Research Vessels during the month

Vessel	Days at Sea/ Utilization	Maintenance/ Inspection/Scientific Logistics/ Cruise Preparation	No. of Cruise
Sagar Nidhi	28	2	2
Sagar Manjusha	14	16	1
Sagar Tara	6	24	1
Sagar Anveshika	16	14	1
Sagar Kanya	0	30	0
Sagar Sampada	0	30	0



No MoES/20/01/2017-Estt. (Computer No. 7107)  
Government of India  
Ministry of Earth Sciences

Prithvi Bhavan, Lodhi Road  
New Delhi-110 003

Dated, the 13<sup>th</sup> December, 2022

**CERTIFICATE**

(FOR THE MONTH OF NOVEMBER, 2022)

It is certified that the detailed status regarding all the posts pertaining to Ministry of Earth Sciences have been updated on AVMS as on last day of the month of November, 2022. A summary of the status is given below:-

- |  |      |
|--|------|
| a. The total number of posts required to be entered on AVMS        | - 13 |
| b. Number of posts filled as on date                               | - 11 |
| c. Number of posts totally vacant as on date                       | - 02 |
| d. Number of posts under additional charge arrangement             | - 00 |
| e. Number of posts that would fall vacant during the next 6 months | - 00 |



(D Senthil Pandiyan)  
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A-11  
12/12/22

o/c