

**Ministry of Earth Sciences (MoES)**

**Govt. of India**

**Summary of Important Developments – November, 2023**

**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):**

As a part of Special Campaign 3.0, various activities were carried out under Swachhta Abhiyan during the month of November 2023 in MoES and its institutes.

**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. Application for registration of Umbrella Autonomous Society 'Earth System Science Council' in Delhi was filed with Registrar of Societies, Delhi.

**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 Appointments Committee of Cabinet (ACC) have been updated on ACC Vacancy Monitoring System (AVMS) and are placed at Annex-II.

**9. List of cases in which ACC directions have not been compiled with:**

It is confirmed that the directions of ACC are complied with.

**10. Details of Foreign Direct Investment (FDI) Proposals cleared during the month and status of FDI proposals awaiting approval in the Ministry/ Department:**

Not Applicable.

\*\*\*\*\*

**Important policy decision taken and major achievements:**

- A delegation led by the Secretary, MoES and including Additional Secretary & Financial Advisor (AS&FA), MoES, Director, National Centre for Polar and Ocean Research (NCPOR) and Group Director, Antarctic Operations participated in the Indian Antarctic Expedition during 2-14 November 2023.
- A Report on the preliminary investigation for the causes of the discolouration of coastal waters of Puducherry submitted to Puducherry Pollution Control Board by National Centre for Coastal Research (NCCR).
- A report on the protection measures for Kappad and draft report for Varkala cliff, Kerala submitted to Irrigation Department, Govt of Kerala by National Centre for Coastal Research (NCCR).
- An independent sub-sea mooring consisting of a Deep-Water Ambient Noise Measurement System (DANMS) with two hydrophones was deployed in the South-Eastern Arabian Sea (for the first time in India) by National Institute of Ocean Technology (NIOT).
- An agreement was signed between National Institute of Ocean Technology (NIOT) and Harbour Engineering Department, Government of Kerala on November 22, 2023 to provide a scientific solution for the Sustainable opening of the Puthu Ponnani Estuary mouth in Kerala.
- Micro Rain Radar and Impact Disdrometer are installed at Guwahati University, Assam, as part of the northeast observational program.

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)	*479	--	479
Automatic Rain Gauge (ARG)	**455	--	455
Agro AWS	200	--	194
Global Positioning System (GPS) Sonde based Radio-Sonde (RS)/ Radio-Wind (RW) stations	56	--	56
Doppler Weather Radar (DWR)	***41	--	32
Ozone (Ozone Sonde + Total Ozone)	02	--	02
Surface Ozone (Electrochemical Concentration Cell method)	07	--	05
Nephelometer	12	--	09
Sky Radiometer	20	--	13
Black Carbon Monitoring Systems (Aethalometer)	25	--	19
Air Quality Monitoring System (System of Air Quality and Weather Forecasting and Research (SAFAR))	10 (Delhi) 10 (Mumbai) 10 (Ahmedabad)	--	09 (Delhi) ****NIL (Mumbai) NIL (Ahmedabad)
Hydromet. (India Meteorological Department (IMD) & Extra-	---	--	3146

<b>Observation Type</b>	<b>Commissioned so far</b>	<b>Installations during the month</b>	<b>Data Reporting</b>
departmental excluding AWS & ARG)			
Aviation	100	--	100
Radiation Stations	47	---	47

\* Out of Total 808 commissioned, 329 are outlived.

\*\* Out of total 1382 commissioned, 927 are outlived.

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

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

## **Modelling**

During November 2023, 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 30<sup>th</sup> November 2023 the monthly mean forecast valid for November 2023 were also included for the users.

## **Monthly Weather Summary (November 2023)**

### **a) Important Weather Events during the month**

#### Low Pressure Systems:

During the month of the November 2023, a total of three low pressure systems (LPS) formed over Indian region (one over Arabian Sea and two over Bay of Bengal). The 1st system was formed as a low-Pressure System over southeast Arabian Sea. The 2nd system was observed as a cyclonic circulation and intensified in to Cyclonic Storm “Midhili” over Bay of Bengal. The 3rd System was also observed as a Cyclonic Circulation and lay over South Andaman Sea & adjoining south Thailand and then

concentrated into a Depression over Southeast & adjoining Southwest Bay of Bengal on 1st December, 2023. It intensified into a Cyclonic Storm “MICHAUNG” (pronounced as MIGJAUM) over the same region on 3rd December, 2023.

Western Disturbances (WDs):

5 (6-9, 9-13, 18-22, 20-24, 25-29 Nov 2023) WDs moved across north India. Out of which three WDs did not cause any significant weather over north India. But other 2 WDs (9-13 Nov and 25-29 Nov) along with their induced cyclonic circulation caused significant weather over north and central India. Severe weather events were observed and caused fairly widespread to widespread rainfall with isolated heavy to heavy rainfall along with thunderstorm & hailstorm activity over Gujarat, south Rajasthan, West Madhya Pradesh and north Maharashtra. With their further east-ward movement, it also caused cloudy conditions and isolated light to moderate rain and thunderstorms accompanied with lightning over other parts of northwest India and Uttar Pradesh including Delhi.

Delhi Air Quality Summary:

There was four poor days in terms of data. There were no good, satisfactory as well as moderate categories days in Delhi during this period. In addition, air quality of Delhi was in 17 days and 9 days in very poor and severe category respectively.

**b) Rainfall Scenario:**

The rainfall for the country as a whole, for the month of November-2023 has been recorded as 34.6 mm which is 116% of its Long Period Average (LPA) of 29.7 mm.

**c) Heavy Rainfall Events:**

Warning issued for	No. of Heavy/Very Heavy Rainfall Events (>64.4 mm): 306
	Percentage correct (in %) for Rainfall >64.4mm
Day1 / 24 Hours	92
Day2 / 48 Hours	93
Day3 / 72 Hours	93

**d) Temperature Scenario:**

The mean temperature for the month of November 2023 for the country as a whole was 24.35°C which was above normal by +1.13°C. The normal temperature for the month is 23.22°C, which was highest since 1901. The maximum temperature of 38.5°C had been recorded at Bhuj (Saurashtra & Kutch) on 2nd November 2023 and the minimum temperature of 7.0°C had been recorded at Sikar (East Rajasthan) on 23rd November 2023 over the plains of the country during the month.

**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	Thunder Storm Days	Hail Events	Squall Events	Dust storms
1.	South Peninsular India	11	Nil	Nil	Nil
2.	Northwest India	10	1 {Jalore (East Rajasthan) on 26 <sup>th</sup> November}	Nil	Nil
3.	Northeast India	2	Nil	Nil	Nil
4.	East India	11	Nil	Nil	Nil
5.	Central India	7	Nil	Nil	Nil
6.	West India	8	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 Tropical Weather Outlook with cyclogenesis forecast for next 5 days: 20, Daily Warnings for Fishermen in North Indian Ocean for next 5 days including the advisories from sub-offices of IMD (6 hourly): 100, Fleet Forecast for Indian Navy for next 12 hours: 40, Bulletins for ships in deep sea under Global Maritime Distress Safety System for next 36 hours: 40, Bulletins for offshore & onshore industries: 18, Severe Weather Advisory Bulletins for nowcast guidance: 30, Mountain weather bulletins issued for western and central Himalayan region:- 60, Current Temperature Status and Warning bulletins:-30, Press Releases issued during the month:- 41.

## Publications & Operational Reports:

1. El Nino Southern Oscillation (ENSO) bulletin for the month of November 2023 and Seasonal Climate Outlook for South Asia for the period of November to February 2024 were issued. Link:  
[https://imdpune.gov.in/cmpg/Product/ENSO Bulletin/ENSO IOD Update Bulletin\\_11\\_23.pdf](https://imdpune.gov.in/cmpg/Product/ENSO Bulletin/ENSO IOD Update Bulletin_11_23.pdf)
2. Climate Summary for the month of October 2023 issued.
3. Present Weather Detector (PWD) systems were installed at Hindustan Aeronautics Limited (HAL) airport, Bengaluru (Runway (RWY) 27) during 26.10.2023 to 29.10.2023 and at Mysore airport (RWY 09).
4. PWD systems were installed at Kannur airport (RWYs 25 & 07) by Meteorological Centre (MC) Thiruvananthapuram in October 2023.
5. PWD systems were installed at Mangalore airport during 23.11.2023 to 30.1.2023.
6. Climate Diagnostic Bulletin for August and September 2023 has been published and uploaded on the website.

## Seismological Observational Network:

Observation Type	Commissioned so far	Data reporting during the month
Seismic stations	153	130

## Earthquake and Tsunami monitoring

### Earthquake:

182 earthquakes were monitored in the Indian region out of which 6 events were greater than the magnitude (M) of 5.0.

### Tsunami:

6 seabed earthquakes (M>6) with a potential to generate tsunami have occurred during the month. The information was disseminated in less than 12 minutes of occurrence of the events.

## Ocean Observation System

Type of Platform	Commissioned till during the month	Data received during the month
Argo Floats	98	58



Moored Buoys	19	14
Tide Gauges	36	32
High Frequency (HF) Radars	10	8
Acoustic Doppler Current Profiler (ADCP)	20	17
Tsunami Buoys	7	3
Wave Rider Buoy	16	10

### **Ocean Science Services**

<b>S. 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	31
4.	Real time global ocean analysis (daily)	30
5.	Coral Bleaching Alert System	10

### **Outreach and Awareness**

- India Meteorological Department (IMD) organized a series of lectures with Permanent Representatives and Eminent Scientists from various World Meteorological Organization (WMO)/ Economic and Social Commission for Asia and the Pacific (ESCAP) Panel on Tropical Cyclones member countries during August-November.
- Delegation from Ghana, visited India Meteorological Department (IMD) on 23<sup>rd</sup> November to have an overview of the forecasting techniques and practices at IMD.
- 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.).
- The forecast videos in regional language were issued by regional offices of IMD regularly.

- Daily interviews were provided by the forecasters within the country.
- Bulletins and Warnings along with graphics were also communicated through social media including Facebook, Twitter, Instagram, YouTube and IMD Blog page.
- M.Sc. Students from Calcutta University are undergoing training on Numerical Weather Prediction (NWP) and Data Assimilation Familiarization Course along with hands-on from 29 Nov to 08th Dec. 2023 at National Centre for Medium Range Weather Forecasting (NCMRWF).
- National Institute of Ocean Technology (NIOT) and Indian Institute of Tropical Meteorology (IITM) have celebrated its foundation day celebrations during the month.
- MoES and its institutes observed vigilance awareness week during 30.10.2023 to 05.11.2023.
- Students from various colleges/ institutes/ universities/ schools visited Indian Institute of Tropical Meteorology (IITM) and Indian National Centre for Ocean Information Services (INCOIS).
- On 5 November 2023, World Tsunami Awareness Day, the Odisha State Disaster Management Authority conducted a Tsunami Mock Exercise based on test bulletins issued by INCOIS to Odisha. Around twenty thousand (20,000) people from thirty (30) villages, under eighteen (18) blocks of six (6) coastal districts participated and were evacuated to higher ground. Thirty (30) Intergovernmental Oceanographic Commission (IOC) - United Nations Educational, Scientific and Cultural Organization (UNESCO) Tsunami Ready programme implementing communities participated in the exercise to evaluate Tsunami Ready Indicators. The exercises helped to test communication lines, review Standard Operating Procedures (SOPs), and enhance emergency preparedness. Emergency strategies were fine-tuned based on the simulated scenarios.
- One hundred and sixty-three (163) High wave/ Swell Surge Alert/ Rough Sea Alert were issued to West and East Coast of India, Andaman & Nicobar Islands by INCOIS.
- Twenty-Five (25) days of Algal Bloom Information Service were issued, and no alert was generated by INCOIS.

## Publications

Subject	Publications			Ph.Ds.		
	Apr 2023 – Oct 2023	Nov 2023	Total	Apr 2023 – Oct 2023	Nov 2023	Total
Atmospheric Sciences	97	13	110	8	2	10
Ocean Science and Technology	66	9	75	2	0	2
Polar Sciences	18	2	20	0	0	0
Geosciences and resources	30	2	32	5	0	5
<b>Total</b>	<b>211</b>	<b>26</b>	<b>237</b>	<b>15</b>	<b>2</b>	<b>17</b>

## Utilization of Ocean Research Vessels during the month

Vessel	Days at Sea/ Utilization	Maintenance/ Inspection/ Scientific Logistics/ Cruise Preparation	No. of Cruises
Sagar Nidhi	28	2	2
Sagar Manjusha	22	8	2
Sagar Tara	23	7	2
Sagar Anveshika	15	15	1
Sagar Kanya	0	30	0
Sagar Sampada	0	30	0

No.MoES/20/01/2017-Estt.  
Government of India  
Ministry of Earth Sciences

Prithvi Bhavan, Lodhi Road  
New Delhi-110 003  
Dated, the 5 December, 2023

**CERTIFICATE  
(FOR THE MONTH OF NOVEMBER, 2023)**

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, 2023. 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 01 Deputy Secretary appointed under Central Staffing Scheme)	–	11 (including
c. Number of posts totally vacant as on date	–	01
d. Number of posts under additional charge arrangement	–	01
e. Number of posts that would fall vacant during the next 6 months	–	01

  
( Dharkat R Luikang )  
Deputy Secretary  
dharkat@nic.in