

Ministry of Earth Sciences (MoES)
Govt. of India
Summary of Important Developments – December, 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 December 2023 in MoES and its institutes.

6. Status of Rationalization of Autonomous Bodies:

The Cabinet in its meeting on 13th 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:

- The Hon'ble Union Minister, Ministry of Earth Sciences (MoES), Sh Kiren Rijju, flagged off India's first winter scientific expedition to the Arctic from the MoES headquarters in New Delhi on 18th December 2023. Arctic winter expedition batch-01 reached Himadri station on 21st December 2023.
- To commemorate the 150 years of foundation of IMD, the Hon'ble Union Minister, Ministry of Earth Sciences (MoES), Sh Kiren Rijju released the logo of 150 years of service of IMD to the nation on 26th December, 2023.
- A sensor of lightning location network was installed at Itanagar, Arunachal Pradesh and integrated with the central processor at IITM.
- Autonomous beach monitoring system was installed at Puduchery Beach to monitor the nearshore coastal process and morphology.
- NIOT used its Autonomous Underwater Vehicle (AUV) for scientific exploration at the gas hydrate site in the KG basin. An underwater image of seafloor gas hydrate occurrence was captured using AUV at 1790m water depth in the KG basin.
- IMD issued outlook for the Temperatures for the Winter Season (Dec. 2023-Feb. 2024):
 - During the upcoming winter season (December 2023 to February 2024), above normal minimum temperatures are likely over most parts of the country.
 - The occurrence of cold waves over north, northwest, central, east and northeast parts of country during the upcoming winter season (December 2023 to February 2024) is likely to be below normal.

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

Observation Type	Commissioned so far	Installations during the month	Data Reporting
Automatic Weather Station (AWS)	*491	--	491
Automatic Rain Gauge (ARG)	**434	--	434
Agro AWS	200	--	196
Global Positioning System (GPS) Sonde based Radio-Sonde (RS)/ Radio-Wind (RW) stations	56	--	56
Doppler Weather Radar (DWR)	***41	--	35
Ozone (Ozone Sonde + Total Ozone)	02	--	02
Surface Ozone (Electrochemical Concentration Cell method)	09	--	06
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)

Observation Type	Commissioned so far	Installations during the month	Data Reporting
Hydromet. (India Meteorological Department (IMD) & Extra-departmental AWS & ARG) excluding	---	--	3155
Aviation	100	--	100
Radiation Stations	47	---	47

* Out of Total 808 commissioned, 317 are outlived.

** Out of total 1382 commissioned, 948 are outlived.

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

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

Modelling

During December 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 28th December 2023 the monthly mean forecast valid for January 2024 were also included for the users.

Monthly Weather Summary (December 2023)

a) Important Weather Events during the month

Low Pressure Systems:

A cyclonic circulation emerged into South Andaman Sea and adjoining South Thailand on 26th November 2023. It intensified into a Cyclonic Storm "MICHAUNG" (pronounced as MIGJAUM) over the southwest Bay of Bengal on 3rd December, 2023. It then moved northwestwards and intensified into a Severe Cyclonic Storm

over the West central & adjoining Southwest Bay of Bengal off south Andhra Pradesh and adjoining north Tamil Nadu coasts on 4th December.

Western Disturbances (WDs):

About five numbers of WDs during 3rd -7th, 11th -14th, 15th -19th, 20th -24th & 28th -31st December 2023 moved across extreme north India. Most of these WDs were feeble and not caused severe weather except the WD during 3rd -7th December which caused isolated light to moderate rainfall over northwest India.

Fog:

Dense fog was observed at isolated pockets of Punjab during 17-21 Dec and then intensified and was gradually spread over to Haryana, Uttar Pradesh, Delhi, North Rajasthan, North Madhya Pradesh, Jammu-Kashmir and East India. This large-scale dense fog layer was almost persisted over many pockets across Indo-Gangetic Plains till end of the month. Simultaneously, the lifted fog/ low cloud created Cold day to Severe Cold day conditions over the plains of Northwest India from 29 December till 31 Dec 2023.

b) Rainfall Scenario:

The rainfall for the country, for the month of December-2023 has been recorded as 25.5 mm which is 160% of its Long Period Average (LPA) of 15.9 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	96
Day2 / 48 Hours	96
Day3 / 72 Hours	96

d) Temperature Scenario:

The mean temperature for the month of December-2023 for the country as a whole was 21.6°C which was above normal by +1.11°C, which was highest since 1901. The maximum temperature of 37.2°C had been recorded at Kannur (Kerala & Mahe) on

30th December 2023 and the minimum temperature of 2.8°C had been recorded at Ludhiana (Punjab) 21st December 2023 and Sikar (East Rajasthan) on 22nd December 2023 over the plains of the country during the month.

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	7	Nil	Nil	Nil
2.	Northwest India	2	Nil	Nil	Nil
3.	Northeast India	1	Nil	Nil	Nil
4.	East India	6	Nil	Nil	Nil
5.	Central India	0	Nil	Nil	Nil
6.	West India	2	Nil	Nil	Nil

Bulletins/Warnings/Press Releases Issued:

All India Weather Bulletins:- 124, All India inference and severe weather warnings:- 124, All India Weekly Weather Reports:- 4, Daily Tropical Weather Outlook with cyclogenesis forecast for next 5 days: 25, 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: 50, Bulletins for ships in deep sea under Global Maritime Distress Safety System for next 36 hours: 50, Bulletins for offshore & onshore industries: 27, Severe Weather Advisory Bulletins for nowcast guidance: 31, Mountain weather bulletins issued for western and central Himalayan region:- 62, All India Multi-hazard winter weather warnings bulletin issued for North India :-21, All India Multi-hazard winter weather warnings bulletin issued for North India – 21, Current Temperature Status and Warning bulletins:-31, Press Releases issued during the month:- 48.

Publications & Operational Reports:

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

2. El Nino Southern Oscillation (ENSO) bulletin for the month of December 2023 and Seasonal Climate Outlook for South Asia for the period of December to March 2024 were issued. (QuickLink:https://imdpune.gov.in/cmpg/Product/ENSO_Bulletin/ENSO_IOD_Update_Bulletin_12_23.pdf)
3. Climate Summary for the month of November 2023 Issued.
4. 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	156	118

Earthquake and Tsunami monitoring

Earthquake:

156 earthquakes were monitored in the Indian region out of which 5 events were greater than the magnitude (M) of 5.0.

Tsunami:

4 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	57
Moored Buoys	19	15
Tide Gauges	36	33
High Frequency (HF) Radars	10	8
Acoustic Doppler Current Profiler (ADCP)	20	17
Tsunami Buoys	7	5
Wave Rider Buoy	16	13

Ocean Science Services

S. No.	Types of forecasts	No. of advisories issued during the month
1.	Integrated Potential Fishing Zone (PFZ) advisories (Sea Surface Temperature (SST), Chlorophyll., wind)	30
2.	Tuna Fishing Advisories	8
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)	30
5.	Coral Bleaching Alert System	11

Outreach and Awareness

- A two-week training course was conducted for five (5) officials from Oman on 'Oman National Multi-Hazard Early Warning System' at INCOIS-ITCOcean from 11- 21 December 2023.
- A one-week training course on 'Ocean Color Remote Sensing - Data, Processing and Analysis' was organized in collaboration with Ocean Teacher Global Academy at INCOIS-ITCOcean during 4-8 December 2023. Twenty-three (23) participants from Bangladesh, Indonesia, Mozambique, and India attended.
- One hundred and forty (140) High wave/Swell Surge Alert/ Rough Sea Alert were issued to West and East Coast of India, Andaman & Nicobar Islands.
- Thirty (30) INCOIS-IMD joint bulletins were issued for the severe cyclonic storm "Michaung" over the Bay of Bengal off the south-eastern coast of India during 1-6 December 2023. Nineteen (19) Storm surge and inundation forecasts were issued by INCOIS through IMD.
- INCOIS provided weekly updates including past week briefing and upcoming week forecast of Ocean State Forecast information (Wave, Wind, Current, Swell, Sea Surface Temperature) for Indian Ocean to South Asia Hydromet Forum (SAHF) which is administrated by RIMES.
- Officers/ Students from various colleges/ institutes/ universities/ schools visited Indian National Centre for Ocean Information Services (INCOIS), IITM and NCMRWF.

- INCOIS led a public event, 'Ocean Observations, Information and Advisory Services for a Sustainable and Resilient Blue Economy' at Ocean Pavilion at COP28, UAE on December 9 2023.
- INCOIS hosted a live popular science talk 'Saving the Green Lungs of the Coast: Remote Sensing for Mangrove Conservation' on its YouTube channel by Prof. Dr. Kasturi Devi Kanniah, Geoinformation Prog., Faculty of Built Environment and Surveying, Universiti Teknologi Malaysia (UTM), Malaysia.
- NCMRWF hosted one-day outreach program on 20th December 2023 as a curtain-raiser to the IISF-2023.
- Four days national training workshop on 'Climate impacts of Carbonaceous Aerosols and Measurements (NT-CCAM)' was organized at IITM Pune during 4-7 December 2023. The workshop was attended by 44 participants from different institutes.
- IMD organized a technical conference on "Advancements of Cyclone Warning services" through World Meteorological Organization/ Economic and Social Commission for Asia and the Pacific (WMO/ESCAP) Panel on Tropical Cyclones (PTC)" on 19th December 2023.
- A "Customized Tailor-Made Meteorological Training" programme was organized by IMD during 20th November to 15th December 2023 for 5 Met. Trainees from Bhutan.
- Fifteen IAF personnel who have been deployed to Myanmar for the installation of Meteorological Instruments were imparted training on the 'Installation, operation and maintenance of aviation meteorological instruments' from 6th to 8th December, 2023.
- 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.

Publications

Subject	Publications			Ph.Ds.		
	Apr 2023 – Nov 2023	Dec 2023	Total	Apr 2023 – Nov 2023	Dec 2023	Total
Atmospheric Sciences	110	12	122	10	1	11
Ocean Science and Technology	75	8	83	2	2	4
Polar Sciences	20	1	21	0	0	0
Geosciences and resources	32	8	40	5	0	5
Total	237	29	266	17	3	20

Patents: 1

Utilization of Ocean Research Vessels during the month

Vessel	Days at Sea/ Utilization	Maintenance/ Inspection/ Scientific Logistics/ Cruise Preparation	No. of Cruises
Sagar Nidhi	22	9	2
Sagar Manjusha	14	17	1
Sagar Tara	19	13	2
Sagar Anveshika	12	19	1
Sagar Kanya	0	31	0
Sagar Sampada	0	31	0

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

Prithvi Bhavan, Lodhi Road
New Delhi-110 003
Dated, the 4 January, 2024

**CERTIFICATE
(FOR THE MONTH OF DECEMBER, 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 December, 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:
(including 01 Deputy Secretary appointed under Central Staffing Scheme) | 11 |
| 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 |


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