

Ministry of Earth Sciences (MoES)

Summary of Important Developments – November,2021

1. **Important policy decisions taken and major achievements during the month:** Provided in Annex I.
2. **Important policy aspects / matters held up on account of prolonged Inter- Ministerial consultations/ delays, etc.:** Nil
3. **Compliance of COS (Committee of Secretaries) decisions:**

S.No.	Number of COS decisions pending for compliance	Proposed action plan/timelines	Remarks
1.	<p>Dt 14/08/2014 PROPOSAL FOR KRILL FISHING</p> <p>MoES, in collaboration with MEA (Ministry of External Affairs), will study the experience of different countries showing varied interest in krill fishing so that India could learn from their experiences. MEA, in collaboration with MoES, will examine and identify the countries with which India can collaborate for krill fishing. MoES will ascertain the interest of Indian industry in krill fishing and also explore the feasibility of Indian companies collaborating directly with foreign companies MoES will study legislations enacted by other member countries before finalising the draft legislation as part of international convention obligations.</p> <p>MoES will bring out a paper on krill fishing giving a detailed account of demand analysis, financial viability, interest of industry, experiences of other countries, criteria for fishing license, existing knowledge gap, etc. Thereafter, the CoS will meet again to decide whether India should engage in commercial krill fishing.</p>	<p>The Ministry has examined the aspect of Krill fishing. Japan & Norway have developed expertise and these countries have been tentatively identified for collaboration on Krill fishing. Their experiences have been obtained. Indian Industries have been approached for Krill fishing to ascertain their interests. However, so far we have not received any response. The draft paper is prepared and suggestions of Cabinet Secretariat have been obtained.</p>	<p>A proposal has been mooted through NITI Aayog for collaboration with Norway for krill fishing.</p>

4. **Cases of sanction for prosecution pending in the Ministry for more than three months:** Nil
5. **Particulars of cases in which there has been a departure from the Transaction of Business rules of established policy of the Government:** Nil
6. **Status of implementation of e-Governance:** Being implemented
7. **Status of Public grievances:**

No. of Public Grievances redressed during the month	No. of Public Grievances pending at the end of the month
22	15

8. Information on the specific steps taken by the Ministry/Department 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.

9. (i) **Confirmation that the incumbency details of all posts in the Ministry/Department and its organizations falling under the purview of the ACC (Appointments Committee of Cabinets) have been updated on AVMS(ACC Vacancy Monitoring System):** 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.
- (ii) **Status regarding compliance of the directions of ACC:** It is also confirmed that the directions of ACC are complied with.
- (iii) **Status of cases where recommendations from PESB(Public Enterprise Selection Board) have been received but the proposals are yet to be submitted to the ACC Secretariat:** NIL

Important policy decision taken and major achievements:

- Monthly rainfall for November 2021 over the South Peninsular India consisting of meteorological subdivisions (Tamil Nadu, Puducherry & Karaikal, Coastal Andhra Pradesh & Yanam, Rayalaseema, Kerala & Mahe and South Interior Karnataka) is above normal (>122% of Long Period Average (LPA)).
- 41st – Indian Scientific Expedition to Antarctica launched from National Centre for Polar and Ocean Research (NCPOR), Goa. Batch # 1 of 23-members completed their mandatory quarantine in Cape Town before reaching Antarctica on 09 November 2021.
- A MoU has been signed between National Centre for Coastal Research (NCCR) and Irrigation Department, Government of Kerala, on 25th November 2021 in the presence of Hon'ble Chief Minister of Kerala.
- Hon'ble Lt. Governor of Puducherry, Dr. Tamilisai Soundararajan visited National Institute of Ocean Technology (NIOT) and discussed about Puducherry beach restoration project and the measures to mitigate Coastal Erosion & Flooding in the Puducherry & Karaikal regions.

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 28.78 million farmers in the country are getting advisories through SMS 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)	*356 (727-371)	--	356
Automatic Rain Gauge (ARG)	515** (1382-867)		515
Agro AWS	183	9	174
GPS Sonde based RS/RW (Radio Sonde/ Radio Wind Stations)	56	--	56
Doppler Weather Radar (DWR)	*** 29		28
Ozone (Ozone Sonde + Total Ozone)	04	--	04
Surface Ozone (Electrochemical Concentration Cell method)	07	--	07

Nephelometer	12	--	10
Sky Radiometer	20	--	13
Black Carbon Monitoring Systems (Aethalometer)	25	--	21
System of Air Quality Monitoring System (SAFAR)	10 (Delhi) 10 (Mumbai) 10 (Ahmedabad)	--	09(Delhi) NIL(Mumbai)**** 10 (Ahmedabad)
Hydromet (Indian Meteorological Department (IMD)& Extra-departmental excluding AWS &ARG)	---	--	3429
Aviation	79	--	79
Radiation Stations	46	---	46

*Out of Total 727, 371 are outlived.

** Out of total 1382, 867 are outlived.

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

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

Modelling

During November 2021, 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) Snow and Avalanche Study Establishment (SASE), (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 SASE/ DRDO an IAF for use at their end.

Monthly Weather Summary (November 2021)

a) Important Weather Events during the month

Low Pressure Systems: A low pressure area formed over central parts of south Bay of Bengal on 27th October, 2021. The system did not cause any adverse weather over the Indian region. Two low pressure areas are formed over the South East Bay of Bengal (BoB) and south Andaman Sea & adjoining Thailand on 9th and 13th November, 2021. These systems have caused heavy to extremely heavy rainfall over Tamil Nadu, Puducherry, Karaikal and Rayalaseema.

Movement of a Western Disturbance and its induced cyclonic circulation have caused isolated to scattered rainfall/thunderstorm activity over Western Himalayan Region and isolated rainfall activity over adjoining areas of northwest India during the beginning of the month. Remnants of Western Disturbance have caused isolated rainfall/thunderstorm activity over parts of Northeast and adjoining areas of East India during the month.

b) Rainfall Scenario: The rainfall for the country as a whole, for the month of November 2021 has been recorded as 56.5 mm which is 186% of its Long Period Average (LPA) of 30.4 mm.

c) Heavy Rainfall Events:

Warning issued for	No. of Heavy/Very Heavy Rainfall Events (>64.4 mm): 217
	Percentage correct (in %) for Rainfall >64.4mm
Day1 / 24 Hours	91
Day2 / 48 Hours	90
Day3 / 72 Hours	90

d) Temperature Scenario: The mean temperature for the month of November 2021 for the country as a whole was 23.50⁰C which was above normal by 0.28⁰C. The highest maximum temperature of 37.1⁰C had been recorded at Ratnagiri (Konkan& Goa) on 16th November 2021 and the lowest minimum temperature of 5.2⁰C had been recorded at Sikar (East Rajasthan) on 17th November-2021 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	Date of Maximum TS Activity	Hail Events	Squall Events	Dust storms
1.	South Peninsular India	30	1 November	Nil	Nil	Nil
2.	Northwest India	4	3 November	Nil	Nil	Nil
3.	Northeast India	0	-	Nil	Nil	Nil
4.	East India	13	2 November & 23 November	Nil	1 {Port Blair-1 (on 2 November)}	Nil
5.	Central India	6	-	Nil	Nil	Nil
6.	West India	17	6 November	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, Mountain weather bulletins issued for western and central Himalayan region:-60, Expedition forecast bulletins issued for Indian Army during Twang area expedition:-2 and Indian Army Expedition in Arunachal Pradesh:-5, Marine Weather Bulletins:-60, Nowcast Guidance Bulletins for severe weather:-30, Bulletins of the Severe Weather Forecast Programme (SWFP):-30, Tropical Weather Outlook to World Meteorological Organization (WMO)/ Economic and Social Commission for Asia and the Pacific (ESCAP) Panel member countries or the north Indian Ocean:-30, Extended range outlook on Cyclogenesis (Weekly basis on every Thursday):-4, Press Releases issued during the month:-5.

Publications & Operational Reports:

- i) El Niño-Southern Oscillation (ENSO) bulletin for the month of November 2021 and Seasonal Climate Outlook for South Asia for the period of November to February 2022 were issued.
(Quick Link :www.imdpune.gov.in/Clim_Pred_LRF_New/Products.html)
- ii) Monthly and cumulative Standardized Precipitation Index (SPI) maps were prepared for the month ending October 2021 for use in Climate Diagnostic Bulletin of India. The same have also been uploaded in IMD Pune website.
- iii) Computed gridded SPI & Standardized Precipitation Evapotranspiration 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.
- iv) Four weekly and cumulative Standardized Precipitation Index (SPI) maps were prepared for the weeks ending 03.11.2021, 10.11.2021, 17.11.2021 and 24.11.2021 and supplied for use in Agromet Advisory Services Bulletin. The same have also been uploaded in IMD Pune website.
- v) Four weekly Aridity anomaly maps for the period 28 October to 03 November, 04 to 10, 11 to 17 and 18 to 24 November 2021 have been prepared and uploaded on IMD Web-site.
- vi) Four weekly Aridity anomaly outlook maps for the period 04 to 10, 11 to 17, 18 to 24 and 25 November to 02 December 2021 have been prepared and uploaded on IMD Web-site.
- vii) Four Biweekly Aridity Anomaly maps for the period 21 October to 03 November, 28 October to 10 November, 04 to 17 and 11 to 24 November 2021 have been prepared.
- viii) Four weekly Aridity anomaly maps for the period 28 October to 03 November, 04 to 10, 11 to 17 and 18 to 24 November 2021 have been prepared and mailed to Agrimet for Agromet Advisory Services.
- ix) Monthly Aridity Anomaly Maps for the period October have been prepared and uploaded on IMD Web-site.

Seismological Observational Network

Observation Type	Target	Commissioned so far	Data reporting during the month
Seismic stations	115	150	131

Earthquake and Tsunami monitoring

Earthquake: 136 earthquakes were monitored in the Indian region out of which 6 events were greater than the magnitude (M) of 5.0.

Tsunami: 3 seabed earthquakes (M > 6) with a potential to generate tsunami occurred. These informations were provided in less than 12 minutes of occurrence of all the events.

Ocean Observation System

Type of Platform	Target	Commissioned till November, 2021	Data received during November, 2021
Argo Floats *	200	374	83
Moored Buoys	16	18	12
Tide Gauges	36	36	30
High Frequency (HF) Radars	10	12	9
Acoustic Doppler Current Profiler (ADCP)	20	20	18
Tsunami Buoys	4	7	3
Wave Rider Buoy	23	16	11

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

Ocean Science Services

No	Types of forecasts	No. of advisories issued during the month
1.	Integrated Potential Fishing Zone (PFZ) advisories (Sea Surface Temperature (SST), Chlorophyll., wind)	29
2.	Tuna Fishing Advisories	25
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	10

Outreach and Awareness

- As part of Azadi Ka Amrit Mahotsav, an awareness class on the topic “Marine Living Resources Research in India: Status and Trends” was given to volunteers of ‘Jawahar Munch’, a Kochi based Non-Governmental Organisation (NGO) involved in nurturing young students on Nov 20th , 2021 by CMLRE.
- An Exhibition onboard Fishery Oceanographic Research Vessel (FORV) Sagar Sampada was conducted for the college students in connection with India International Science Festival on Nov 24th 2021 by CMLRE.
- Poster, Poem, lecture series and Quiz programmes were held during November 2021 as a part of “Azadi Ka Amrit Mahotsav” at all MoES Institutes.
- Vigilance Awareness Week was observed during 26.10.2021 to 01.11.2021 at IMD in respective division and all the officials took pledge pertaining to integrity.
- Joint IMD-WMO Fellowship Training Course on “Numerical Weather Prediction (NWP)” has been conducted from 4th October to 10th November, 2021 through online mode at Meteorological Training Institute (MTI), Pune with 26 participants including 19 overseas participants from 10 different countries & 7 National participants from different organizations of India.
- 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) was 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.
- To commemorate World Tsunami Awareness Day on 05 November 2021, Indian National Centre for Ocean Information Services (INCOIS) conducted a tsunami mock drill in coordination with Odisha State Disaster Management Authority (OSDMA) wherein INCOIS issued bulletins to Odisha stakeholders for evaluating their Standard operating procedures (SOPs) and Communication media. A total of 69 coastal communities/wards actively participated and evacuated during tsunami mock drills to test the tsunami-ready indicators.
- An international training course/workshop on "Biological Observations in the Indian Ocean (From Microbes to Megafauna)' was conducted at International Training Centre for

Operational Oceanography (ITCOcean)/INCOIS during 8-12 November 2021. Total seventy (70) participants have attended the workshop including 46 foreign nationals.

- Students and the general public visited INCOIS laboratories as part of 'India International Science Festival (IISF) 2021 Open Day' at INCOIS on 26 November 2021. INCOIS scientists explained how science reaches society and the usefulness of various ocean instruments.
- All staff of MoES and its institutes took the Preamble on 26 November 2021 as part of our National Constitution Day (SamvidhanDiwas) celebrations.
- To improve the awareness of tsunami among school children, a visit was organized for 70 students of Bhashyam School to Tsunami Warning Centre to understand the services as part of world tsunami awareness day on 5 November 2021. Tsunami Awareness material distributed to School children.
- A sensitization webinar on Tsunami Early Warnings and Tsunami Ready Programme was conducted to Andhra Pradesh State Disaster Management Authority Officials.
- Indian Institute of Tropical Meteorology (IITM) - COsmic-ray Soil Moisture Observing System (COSMOS) Team (4 members) under Azadi Ka Amrit Mahotsav activity visited PimpriChinchwad College Of Engineering (PCCOEngg), Pune for techno-scientific interactions on 26 November 2021. Also, IITM organized an online outreach event on 29 November 2021, to highlight and showcase the scientific activities of IITM in Weather and Climate in the context of IISF (organized by the Government of India) for the larger societal benefit.
- IITM, Pune celebrated it's 60th Foundation Day on 17 November 2021 through virtual mode in view of the prevailing Pandemic situation and austerity measures.
- The paper by BeraSudarsan, Prabhakaran Thara entitled 'Parameterization of entrainment rate and mass-flux in continental cumulus clouds: Inference from large eddy simulation' published in Journal of Geophysical Research: Atmospheres, 124, December 2019, DOI:10.1029/2019JD031078, 13127-13139, received the India Meteorological Society (IMS) Award for the best paper on numerical modelling study on monsoon.
- As part of the foundation day activity, a Free Eye Health check-up camp at IITM was organised on 15 & 18 November 2021 for all IITM members and their families. The advanced test facility was provided by the ASG Eye Hospital (Central Government Health Scheme (CGHS) accredited), Pune. An overwhelming response on the Eye Health check-up camp have been observed, in which more than 300 people (staff and family members) completed their eye check-up.
- NCMRWF organized an Open Day Outreach Programme on 27th November 2021 as a precursor to the IISF-2021 to be held during 10-13th December 2021 in Goa. The aim of this "NCMRWF Open-Day" was to provide a platform for the students, teachers and other visitors to exchange their knowledge and ideas to foster scientific and technological innovations in the field of atmospheric science, especially satellite observation, weather and climate modelling and high-performance computing.
- NCMRWF organized 'Poster making competition' for scholl students on theme 'Vigilance Against Corruption in Society' where children from different schools and classes participated and prizes were distributed. The event was organized to mark 'Vigilance Awareness Week 2021' during 26 Oct- 01 Nov 2021 with theme 'Independent India @75: Self Reliance with Integrity'.

Publications

Subject	Publications			Ph.Ds		
	April, 2021 – October 2021	November, 2021	Total	April, 2021 – October 2021	November, 2021	Total
Atmospheric Sciences	145	19	164	4	1	5
Ocean Science and Technology	60	11	71	1	-	1
Polar Sciences	37	3	40	1	-	1
Geosciences and resources	71	10	81	2	-	2
Total	313	43	356	8	1	9

Patents: 1**Utilization of Ocean Research Vessels during the month**

Vessel	Days at Sea / Utilization	Maintenance/ Inspection /Scientific Logistics / Cruise Preparation	No. of Cruise
Sagar Nidhi	9	21	1
SagarManjusha	9	21	1
Sagar Tara	3	27	1
SagarAnveshika	5	25	1
SagarKanya	25	5	1
SagarSampada	0	30	0

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

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Dated, the 15th December, 2021

CERTIFICATE

(FOR THE MONTH OF NOVEMBER, 2021)

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, 2021. 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 | - 10 |
| c. Number of posts totally vacant as on date | - 01 |
| d. Number of posts under additional charge arrangement | - 02 |
| e. Number of posts that would fall vacant during the next 6 months | - 00 |

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15/12/2021