

Ministry of Earth Sciences (MoES)
Summary of Important Developments –December,2020

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>

☐ **Cases of sanction for prosecution pending in the Ministry for more than three months:** Nil

☐ **Particulars of cases in which there has been a departure from the Transaction of Business rules of established policy of the Government:** Nil

☐ **Status of implementation of e-Governance :** Being implemented

☐ **Status of Public grievances:**

No. of Public Grievances redressed during the month	No. of Public Grievances pending at the end of the month
06	12

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

Annex-I

Important policy decision taken and major achievements:

1. Dr. Harsh Vardhan, Hon'ble Union Minister for Health & Family Welfare, Science & Technology, Earth Sciences inaugurated new Meteorological Centre (MC) established at Leh, the capital city of Ladakh on 29th December, 2020 virtually in presence of Sh.R K Mathur, Hon'ble Lt. Governor (UT-Ladakh), and Shri JamyangTsering Namgyal, Hon'ble Member of Parliament from Ladakh.
2. A web-based application "Digital Ocean (www.do.incois.gov.in)" developed by Indian National Centre for Ocean Information Services (INCOIS) was inaugurated by Dr. Harsh Vardhan, Honorable Minister of Health & Family Welfare, Science & Technology, Earth Sciences during a Virtual Meeting held on 29th December 2020.
3. As part of India International Science Festival (IISF) - 2020, Indian Institute of Tropical Meteorology (IITM) organised a virtual Curtain Raiser Ceremony for High-Altitude Cloud Physics Laboratory, Mahabaleshwar and Clean Air Event on 18 December 2020. Dr. Harsh Vardhan, Hon'ble Union Minister for Health and Family Welfare, Science and Technology, and Earth Sciences digitally inaugurated the Ceremony.
4. The 2020 Northeast monsoon season (October-December) rainfall over the country as a whole was normal (101% of Long Period Average). All the five subdivisions (Coastal Andhra Pradesh, Rayalaseema, Tamil Nadu & Puducherry, South Interior Karnataka and Kerala) of the core region except Kerala received excess/normal rainfall.
5. A Memorandum of Understanding (MoU) is signed by INCOIS with Andhra University on 24th December 2020 for establishment of INCOIS field centre within Andhra University Campus.
6. National Facility for Airborne Research (NFAR): For the first time, two test flights were conducted successfully using a quad-copter at Police Grounds in Pune for testing the in-house designed ground equipment for operating a meteorological sensor on UAV for temperature, relative humidity and wind measurements

All instructions / guidelines regarding lockdown due to COVID-19 issued by the government are strictly adhered.

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 40 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)	324*		294
Automatic Rain Gauge (ARG)	358**	1 - Villivakkam District Tiruvallur, Tamil Nadu	338
GPS Sonde based RS/RW (Radio Sonde/Radio Wind) Stations	56	--	56
Doppler Weather Radar (DWR)	28***	1-Mukteshwar, Uttrakhand 1-Sonemarg/Leh, Kashmir 1-Kufri, H.P.	28
Ozone (Ozone Sonde + Total Ozone)	04	--	04
Surface Ozone (Electrochemical Concentration Cell method)	07	--	07
Nephelometer	12	--	12
Sky Radiometer	20	--	19
Black Carbon Monitoring Systems (Aethalometer)	25	--	23
System of Air Quality Monitoring System (SAFAR)	10 (Delhi) 10 (Mumbai) 10 (Ahmedabad)	--	09 (Delhi) 10 (Mumbai) 10 (Ahmedabad)
Hydromet. (Indian Meteorological Department (IMD) & Extra-departmental excluding AWS & ARG)	---	--	3168
Aviation	79	--	79
Radiation Stations	46	---	38

* Out of Total 724, 400 are outlived.

** Out of total 1358, 1000 are outlived.

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

High Wind Speed Recording Systems (HWSR) was installed at Salt lake, PAC (Positional Astronomy Centre) Kolkata and 3 Digital Current Weather Indicating Systems (DCWIS) were installed at Sambra, Guwahati (Runway 02) & BIAL (Bengaluru International Airport Limited), Bangalore (new runway) during the month.

Modelling

Every week on all Thursdays during December 2020, National Centre for Medium Range Weather Forecasting (NCMRWF) provided coupled model based Extended Range Prediction (ERP) up to next four weeks for rainfall, surface temperature, and winds in real-time to Space Applications Centre (SAC) / Indian Space Research Organisation (ISRO), Snow and Avalanche Study Establishment (SASE) / Defence Research and Development Organisation (DRDO), Indian Air Force (IAF), Navy, Geological Survey of India (GSI), India Meteorological Department (IMD), Indian Institute Of Tropical Meteorology Extended Range Prediction (IITM ERP), National Institutes of Health (NIH) and Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) countries. Weekly anomaly of snow forecasts were sent to SASE and IAF.

Monthly Weather Summary (December 2020)

a) Important Weather Events during the month

Low Pressure Systems: During the month, one low pressure system has been formed namely Bureviduring 1-3 December 2020 over South Andaman Sea and adjoining areas of Southeast Bay of Bengal & Equatorial Indian Ocean. The system concentrated into a deep depression over the same region and has caused fairly widespread to widespread rainfall/thunderstorms along with isolated intense rainfall activity over Andaman & Nicobar islands, Tamil Nadu, Puducherry & Karaikkal, Rayalaseema and South Coastal Andhra Pradesh. Two low pressure are have been formed during 9th and 23rd December 2020 including one over Southeast Arabian Sea and another one over Southeast Arabian

Sea and adjoining areas of Equatorial Indian Ocean. These systems have caused isolated rainfall/thunderstorm activity over South Peninsula and Lakshadweep islands.

Fog: Dense to very dense fog had occurred at most places over Punjab, Uttar Pradesh, Odisha, Bihar, Haryana, Chandigarh, Delhi, Rajasthan, Gangetic Sub Himalayan West Bengal, Sikkim, Nagaland, Manipur, Mizoram & Tripura, Tamil Nadu, Puducherry & Karaikkal and Madhya Maharashtra.

b) Rainfall Scenario: The rainfall for the country as a whole for the month of December 2020 has recorded as 17.0mm which is 2% lower than its Long Period Average (LPA) of 17.4mm.

c) Heavy Rainfall Events:

Warning issued for	No. of Heavy/Very Heavy Rainfall Events (>64.4 mm): 23
	Percentage correct (in %) for Rainfall >64.4mm
Day1 / 24 Hours	97%
Day2 / 48 Hours	97%
Day3 / 72 Hours	97%

d) Temperature Scenario: The Mean Temp for the month for the country as a whole was 20.82°C; which was above normal by +0.34°C. The lowest minimum temperature of -1.5°C had been recorded over Churu (West Rajasthan) on 30th December 2020 over the plains of the country during the month.

e) Thunder squall & Hailstorm activity: About six Western disturbances and four induced cyclonic circulations have affected Northwest India during the month and have caused fairly widespread rainfall/snowfall/thunderstorms over Northwest India, Western Himalayan Region with isolated 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
1.	South Peninsular India	15	08-12-20	Nil	Nil
2.	Northwest India	04	12-12-20	01 (Tehri on 12-12-20)	Nil
3.	Northeast India	01	18-12-20	Nil	Nil
4.	East India	00	-	Nil	Nil
5.	Central India	01	15-12-20	Nil	Nil
6.	West India	02	10 & 11-12-2020	Nil	Nil

Bulletins/Warnings/Press Releases Issued:

Relative Humidity and Temperature (Maximum & Minimum) data and forecast are being supplied to NDMA, PMO, Prime Minister Office, PSA as desired by them in connection with COVID-19.

All India Weather Bulletins – 124 (issued four times daily), All India weather inference and severe weather warnings – 124 (issued four times daily), All India Weekly Weather Reports – 5 (issued every Thursday), Mountain weather bulletins including severe weather warnings for Western and Central Himalayan region – 62, Marine Weather forecast Bulletins: 62, Tropical Weather Outlook for the north Indian Ocean – 31, Bulletins of the Severe Weather Forecast Programme -31, Nowcast Guidance Bulletins for severe weather:- 31, Extended range outlook on Cyclogenesis:- 5, End of Season Report for SW Monsoon Season 2020: 1, Related to Low Pressure Area/ Well marked Low/Depression/Cyclones over Arabian Sea/Andaman Sea/Bay of Bengal: 6, Related to Monthly Weather Review for the month of November 2020 and weather outlook for the month of December 2020: 1, Related to wet spell and cold wave: 3, Related to current weather status and outlook for two weeks (24 Dec. 2020 to 6 Jan. 2021): 1, Related to new meteorological centre(MC) at Leh in Ladakh: 1.

Publications & Operational Reports:

- i) Daily All India Weather Summary and Weekly Weather Reports are being brought out on routine basis.
- ii) Five (5) weekly and cumulative Standardized Precipitation Index (SPI) maps were prepared for the weeks ending 02, 09, 16, 23 & 30th December 2020 prepared and uploaded at IMD Pune website.
- iii) Gridded Standardized Precipitation Index (SPI) & Standardized Precipitation Evapotranspiration Index (SPEI) at 0.5*0.5 degree resolution at 4 weekly 1, 2, 3 & 4 monthly time scales computed and maps of same timescales are being uploaded at weekly basis on IMD Pune website.
- iv) El Niño–Southern Oscillation (ENSO) bulletin for December 2020 and Seasonal Climate Outlook for South Asia for the months of December 2020 to March 2021 were issued.
(Quick Link: www.imdpune.gov.in/Clim_Pred_LRF_New/Products.html).

Seismological Observational Network

Observation Type	Target	Commissioned so far	Data reporting during the month
Seismic stations	115	115	100
GPS stations	40	20#	18

20 out of 40 are connected with VSAT, remaining 20 are operating in stand-alone mode.

Earthquake and Tsunami monitoring

Earthquake: 100 earthquakes were monitored in the Indian region out of which 2 events were greater than magnitude (M) of 5.0.

Tsunami: 1 seabed earthquakes (M > 6) with a potential to generate tsunami occurred. This information was provided in less than 12 minutes of occurrence of all the events.

Ocean Observation System

Type of Platform	Target	Commissioned till December, 2020	Data received during December, 2020
Argo Floats *	200	374	119
Moored Buoys	16	19	9
Tide Gauges	36	36	32
High Frequency (HF) Radars	10	12	11
Acoustic Doppler Current Profiler (ADCP)	20	20	18
Tsunami Buoys	7	4	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

No	Types of forecasts	No. of advisories issued during the month
1	Integrated Potential Fishing Zone (PFZ) advisories (Sea Surface Temperature (SST), Chlorophyll., wind)	31
2	Tuna Fishing Advisories	31
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 released annual lightning report on 31st December.

INCOIS co-partner with Amritha Vishwa Vidyapeetham and Environmental Systems Research Institute (ESRI) organized an International symposium on "Tsunami Risk Reduction & Community Resilience" on the occasion of the 16th anniversary of the Indian Ocean Tsunami during 26th December 2020.

INCOIS offered virtual training on the INCOIS oil spill advisory system to Indian Coast Guard Officers of Northwest region on 30th December, 2020. One hundred and seventy eight (178) participants/officers attended this virtual training with hands-on sessions.

IITM Pune conducted series of webinars, panel discussions, Curtain Raiser Events for High-Altitude Cloud Physics Laboratory, Mahabaleshwar and Clean Air Event, film shows, IISF Mega Science Expo, online competitions, etc.

IITM-ENVIS observed "National Pollution Control Day 2020" on 2 December 2020 to commemorate the people who lost their lives in the unfortunate incident of Bhopal Gas Tragedy that occurred on this day in 1984.

An awareness campaign was initiated on "Climate Change and Atmospheric Pollution", an "E-Pledge for Climate Change Warrior", which could be taken any time throughout the year, is displayed on IITM-ENVIS website.

Publications

Subject	Publications			Ph.Ds		
	April-November 2020	December, 2020	Total	April-November 2020	December, 2020	Total
Atmospheric Sciences	154	22	176	4	0	4
Ocean Science and Technology	88	12	100	2	0	2
Polar Sciences	32	6	38	1	0	1
Geosciences and resources	21	2	23	0	0	0
Total	295	42	337	7	0	7

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	17	14	1
Sagar Manjusha	0	31	0
Sagar Tara	12	19	2
Sagar Anveshika	0	31	0
Sagar Kanya	0	31	0
Sagar Sampada	14	17	1

Annex II

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

Prithvi Bhavan, Lodhi Road
New Delhi-110 003

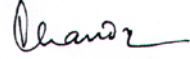
Dated, the 1st January, 2021

CERTIFICATE

(FOR THE MONTH OF DECEMBER, 2020)

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, 2020. 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	- 12
(c)	Number of posts totally vacant as on date	- 01
(d)	Number of posts under additional charge arrangement	- 00
(e)	Number of posts that would fall vacant during the next 6 months	- 00



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