

Ministry of Earth Sciences (MoES)

Summary of Important Developments – September, 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
29	19

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:

- Indian Meteorological Department (IMD) installed Doppler Weather Radar (DWR) in Jammu. Hon'ble Minister of Earth Sciences inaugurated the DWR at Jammu on 5th September, 2021 and dedicated it to the people of Jammu.
- The southwest monsoon seasonal rainfall during June to September for the country as a whole had been normal (96 -104% of Long Period Average (LPA)).
- Northeast Monsoon (October to December (OND)) 2021 seasonal rainfall over the south Peninsular India consisting of five meteorological subdivisions (Tamil Nadu, Coastal Andhra Pradesh, Rayalaseema, Kerala and South Interior Karnataka) is most likely to be normal (89-111% of Long Period Average (LPA)).
- Delhi (Safdarjung) recorded a monthly rainfall of 413.0 mm in September 2021 which is the second highest September rainfall in the last 121 years. The highest September rainfall during the same period being 417.3mm which was recorded in the year 1944.
- World Climate Research Programme (WCRP)'s First South Asia Climate Research Forum (SACRF) with International Monsoon Project Office (IMPO) at Indian Institute of Tropical Meteorology (IITM) was initiated on the 16 September 2021.
- Flood Vulnerability reports were generated using Integrated Flood Warning system for Mumbai (i-flows-Mumbai) and shared with IMD and Brihan Mumbai Municipal Corporation for the heavy rainfall days in September 2021.
- Tsunami Warning Centre, Indian National Center for Ocean Information Services (INCOIS) detected an earthquake of M7.1 on 8 September 2021 at 07:17 hrs IST at Guerrero, Mexico. NO TSUNAMI THREAT to India and Indian Ocean countries.
- Technology Licensing Agreement (TLA) has been signed between NIOT and L&T Defence, Visakhapatnam for commercialization of Drifting Buoys with Indian National Satellite System (INSAT) Communication.
- Technology on bioremediation of hydrocarbon by marine hydrocarbonoclastic bacteria" was transferred to Eco build corp. Pvt. Ltd, Bangalore by National Institute of Ocean Technology (NIOT).
- The seaweed liquid extract was tested (NIOT) and the results indicate that the seaweed based bioplastic films loaded with nanoparticles can be effectively used for food packaging applications.
- Indian Arctic Mooring (IndARC) was successfully recovered with the support of Italian mooring team jointly with National Centre for Polar and Ocean Research (NCPOR). Data was downloaded and found all two years data is in order.

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)	325*		325
Automatic Rain Gauge (ARG)	410**	--	410
GPS Sonde based RS/RW (Radio Sonde/Radio Wind) Stations	56	--	56
Doppler Weather Radar (DWR)	29***	--	27
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) NIL (Mumbai)**** 10 (Ahmedabad)
Hydromet (Indian Meteorological Department (IMD) & Extra-departmental excluding AWS & ARG)	---	--	3345
Aviation	79	--	79
Radiation Stations	46	---	46

*Out of Total 727, 402 are outlived.

** Out of total 1382, 972 are outlived.

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

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

Modelling

During September 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) 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. Weekly snow forecasts were also sent to SASE for use at their end.

Following request from GSI, NCMRWF started sharing the forecast daily rainfall data over West Bengal, Sikkim, Uttarakhand, Tamil Nadu and Kerala as part of GSI's landslide early warning development work.

Vesar Labs a partner of Kerala State Disaster Management agency (KSDMA), Telangana and AP government has started using NCMRWF model forecast data over southern part of India for flood forecasting.

Monthly Weather Summary (September 2021)

a) Important Weather Events during the month

Low Pressure Systems: Six Low pressure systems formed, out of which two have become Well Marked Low pressure areas and one each had attained the intensity of Depression, Deep Depression and Cyclonic Storms respectively. Formation of these Low pressure systems and their west northwest wards movement across the central parts of the country have caused fairly widespread to widespread rainfall/ thunderstorm activity over east, central, west and northwest India on many days along with heavy/ very heavy rainfall over these areas.

Due to frequent formation of the low pressure systems and their west northwest ward movement across central India, the monsoon trough remained south of its normal position on many days during the month; due to this and due to lack of other supporting synoptic weather features, the rainfall activity had been deficient over Northeast India and adjoining areas of East India during the month.

b) Rainfall Scenario: The rainfall for the country as a whole, for the month of September 2021 has been recorded as 229.9 mm which is 135% of its Long Period Average (LPA) of 170.2 mm.

c) Heavy Rainfall Events:

Warning issued for	No. of Heavy/Very Heavy Rainfall Events (>64.4 mm): 471
	Percentage correct (in %) for Rainfall >64.4mm
Day1 / 24 Hours	71%
Day2 / 48 Hours	70%
Day3 / 72 Hours	68%

d) Temperature Scenario: The mean temperature for the month of September 2021 for the country as a whole was 27.79⁰C which was above normal by 0.48⁰C. The highest maximum temperature of 43.4⁰C had been recorded at Agra (West Uttar Pradesh) on 4th September 2021 and the lowest minimum temperature of 16.9⁰C had been recorded at Fatehgarh (East Uttar Pradesh) on 10th September 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	28	21 September	Nil	Nil	Nil

2.	Northwest India	30	10 September	Nil	Nil	Nil
3.	Northeast India	29	7 September	Nil	2 { Itanagr-1 & North Lakhimpur-1 (on 06 September)}	Nil
4.	East India	30	29 September	Nil	7 {Port Blair-7 (on 2, 4, 5, 6, 10 & 25 September)}	Nil
5.	Central India	28	7 September	Nil	Nil	Nil
6.	West India	24	28 September	Nil	1 {Ahmedabad-1 (on 14 September)}	Nil

Bulletins/Warnings/Press Releases Issued:

All India Weather Bulletins:-120, All India inference and severe weather warnings:-120, All India Weekly Weather Reports:-5, Mountain (Mt) weather bulletins issued for western and central Himalayan region:-60, Indian Army during Mt. Nun expedition:-17, State Disaster Response Force (SDRF) during Mt. Gangotri Expedition:-22, Indian Army (Gorkha Rifles) during Mt. Khangchengyao Expedition:-30, Indian Army (14 MECH INF) during Mt. Bhagirathi-II Expedition:-19, Indian Army (5 Armored Reg.) during trekking expedition:-1, Marine Weather Bulletins:-60, Nowcast Guidance Bulletins for severe weather:-30, Special Daily Weather Report for monsoon season 2021: 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):-5.

Publications & Operational Reports:

- i) El Niño-Southern Oscillation (ENSO) bulletin for the month of September 2021 and Seasonal Climate Outlook for South Asia for the period of September to December 2021 were issued.
(Quick Link: www.imdpune.gov.in/Clim_Pred_LRF_New/Products.html)
- ii) Daily All India Weather Summary and Weekly Weather Reports are being brought out on routine basis.
- iii) Long Range Forecast for the Rainfall during Post-monsoon Season (Oct-Dec) 2021 is issued on 30th September 2021.
- iv) Computed 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. Uploaded the maps of the aforementioned timescales at weekly basis on IMD Pune website.
- v) Climatology of Pashan prepared by Meteorological Training Institute (MTI) was released by Dr Somnath Dutta, Scientist 'F' MTI at 1030 Hours IST on 28th September 2021.

Important Press Releases: IMD has released Post Monsoon Seasonal Rainfall Forecast on 30th September 2021. IMD has released Southwest Monsoon Rainfall Forecast for the Month of September 2021. Press release on Cyclonic Storm "Gulab" over the Bay of Bengal and "Shaheen" Severe Cyclonic Storm over the Arabian Sea. Total 47 Press Releases were issued by IMD.

Seismological Observational Network

Observation Type	Target	Commissioned so far	Data reporting during the month
Seismic stations	115	150	135

Earthquake and Tsunami monitoring

Earthquake: 97 earthquakes were monitored in the Indian region out of which 5 events were greater than the magnitude (M) of 5.0.

Tsunami: 1 seabed earthquake (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 September, 2021	Data received during September, 2021
Argo Floats *	200	374	96
Moored Buoys	16	18	13
Tide Gauges	36	36	31
High Frequency (HF) Radars	10	12	12
Acoustic Doppler Current Profiler (ADCP)	20	20	18
Tsunami Buoys	4	7	3
Wave Rider Buoy	23	16	7

*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)	30
2.	Tuna Fishing Advisories	27
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

- Centre for Marine Living Resources and Ecology (CMLRE) organised a Webinar with NEKTON, a United Kingdom based non-profit research organisation undertaking multi-disciplinary and collaborative scientific research on September 20th 2021, on the aspects of the deep sea sampling and data tools. Scientists and engineers of institutes such as NIOT, Bhabha Atomic Research Centre (BARC), Zoological Survey of India (ZSI), National Centre for Coastal Research (NCCR), INCOIS and Pondicherry University participated.
- Hindi Pakhwada (Hindi fortnight celebrations) was conducted at all MoES Institutes.
- NCMRWF organized one day training/ lectures (21-09-21) on “Latest trends in Numerical weather prediction (NWP)” for Indian Air Force meteorology officers. Twenty Six participants including 2 instructors from IAF attended the training program.
- United Nations Educational, Scientific and Cultural Organization (UNESCO)-Intergovernmental Oceanographic Commission (IOC) organised a regional workshop on Standard Operating Procedure (SOP) for Broadcasting Media in Tsunami Warning Chain during 7-9 September 2021. The workshop was focused on the northwest Indian Ocean countries i.e., India, Iran, Oman, Pakistan, and United Arab Emirates (UAE). As part of the workshop, media representatives visited INCOIS on 8 September 2021 and had detailed

discussions on strengthening the engagement of the media in the tsunami early warning processes.

- Training course on Fundamentals of Ocean Modeling was conducted during 27 September - 1 October 2021 by International Training Centre for Operational Oceanography (ITCOcean), INCOIS. Total three hundred and twenty-seven (327) candidates, including one hundred and seven (107) foreign nationals, attended the online training program.
- As an initiative by the MoES, 40th Live Talk on "Earth Sciences Popular Lectures" has been given by Dr. KalachandSain, Director, Wadia Institute of Himalayan Geology, Dehradun on 7 September 2021 on the topic Advanced seismic tools for imaging & interpretation of subsurface features from surface data: Application to Indian Provinces.
- IMD has released Southwest and Post Monsoon Rainfall Forecast for the Month of September 2021 on 1st September 2021 and 30th September 2021 respectively through a Virtual Press Conference.
- 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.) by IMD.
- Daily interview was provided by the forecasters within the country by IMD.
- 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, 2021 – August 2021	September, 2021	Total	April, 2021 – August 2021	September, 2021	Total
Atmospheric Sciences	104	24	128	4	-	4
Ocean Science and Technology	39	12	51	1	-	1
Polar Sciences	28	5	33	-	1	1
Geosciences and resources	49	11	60	-	2	2
Total	220	52	272	5	3	8

Utilization of Ocean Research Vessels during the month

Vessel	Days at Sea / Utilization	Maintenance/ Inspection /Scientific Logistics / Cruise Preparation	No. of Cruise
Sagar Nidhi	2	28	1
SagarManjusha	0	30	0
Sagar Tara	0	30	0
SagarAnveshika	0	30	0
SagarKanya	8	22	1
SagarSampada	0	30	0

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

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Dated, the 06 October, 2021

CERTIFICATE

(FOR THE MONTH OF SEPTEMBER, 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 September, 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 | - 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 | - 02 |

Indira Murthy
06/10/2021
(Indira Murthy)
INDIRA MURTHY
Joint Secretary
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