

Ministry of Earth Sciences (MoES)
Summary of Important Developments –March,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 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, 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
5	10

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 have been updated on AVMS:** 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 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:

All instructions / guidelines issued by the government regarding lockdown due to COVID-19 are strictly adhered. All essential operational services and work related to weather, climate, Ocean, Seismology, observations, air quality monitoring, forecasting services along-with work related to urgent administrative / payments / procurements etc. are being managed with minimum required physical presence of staff at the offices. Maximum work is being done by all concerned officials from their homes through e-mails, e-office, video-conferencing etc.

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

Operation of Research Vessels at sea continued for carrying out scientific cruises, during the lockdown period.

2. There has been significant reduction in pollutant concentration in Delhi and surrounding during the lockdown period (30% – 68% in NO_x and PM_{2.5}) during March, 2020 owing to low vehicular emissions due to COVID-19 pandemic.

3. Seasonal Outlook for temperatures during April to June 2020 indicates that the April-May-June (AMJ) seasonal average minimum and mean temperatures are likely to be warmer than normal by 0.5°C to 1.0°C over most of the subdivisions of northwest, west, central, east and western peninsular India, whereas, the seasonal average maximum temperatures are likely to be warmer than normal by 0.5°C to 1.0°C over some of the meteorological subdivisions of northwest India and western peninsular India. Frequency of heat waves in the core heat wave (HW) zone is likely to be slightly above normal during the season.

4. An analysis of observed monsoon rainfall variability based on the IMD's observational data of recent 30 years (1989- 2018) indicates that five states viz., Uttar Pradesh, Bihar, West Bengal, Meghalaya and Nagaland have shown significant decreasing trends in southwest monsoon rainfall. The annual rainfall over these five states along with the states of Arunachal Pradesh and Himachal Pradesh also show significant decreasing trends. With regard to the frequency of heavy rainfall days, significant increasing trend is observed over Saurashtra & Kutch, Southeastern parts of Rajasthan, Northern parts of Tamil Nadu, Northern parts of Andhra Pradesh and adjoining areas of Southwest Odisha, many parts of Chhattisgarh, Southwest Madhya Pradesh, West Bengal, Manipur & Mizoram, Konkan & Goa and Uttarakhand. The report is available at IMD website <http://www.imdpune.gov.in/hydrology/rainfall%20variability%20page/rainfall%20trend.html>

5. Extended Range Predictions (ERP) from NCMRWF coupled model were started for the BIMSTEC countries from March 2020. This is shared once a week and the forecasts are made for next four weeks. The ERP was also shared with Regional Integrated Multi-Hazard Early Warning System (RIMES) from March 2020.

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 mode. Presently, 40.1 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)	*303 (703-400)	1(Jammu)	268
Automatic Rain Gauge (ARG)	1356	--	358
GPS Sonde based RS/RW Stations	56	--	56
Doppler Weather Radar (DWR)	** 25	--	23
Ozone (Ozone Sonde + Total Ozone)	04	--	04
Surface Ozone (<u>Electrochemical Concentration Cell</u> method)	07	--	07
Nephelometer	12	--	12
Sky Radiometer	20	--	19
Black Carbon Monitoring Systems (Aethalometer)	25	--	22
Air Quality Monitoring System (SAFAR)	10(Delhi) 10(Mumbai) 10(Ahmedabad)	--	09(Delhi) 10(Mumbai) 10(Ahmedabad)
Hydromet. (IMD & Extra-departmental excluding AWS & ARG)	---	--	2874
Aviation	79	--	79
Radiation Stations	46	1 (Jammu)	39

* Out of Total 703, 400 are outlived. ** Includes 2 Doppler Weather Radar of ISRO.

Aviation Weather Observing system comprising of Four(4) Drishti Transmissometer Systems & Two (2) Current Weather Instrument systems on 10meter frangible mast was installed & commissioned at New Runway of Bangalore Airport.

PC based Current Weather Instrument System with 10-meter frangible mast & accessories generating all aviation weather reports including aerodrome climate summary installed & commissioned at Pakyong, Guwahati & Jabalpur Airports.

Monthly Weather Summary (March 2020)

Temperature Scenario: The Mean Temp for the month for the country as a whole was 24.92°C; this was slightly above normal (+0.53°C). Over the plains of the country, the lowest minimum temperature of 7.0°C at Ludhiana (Punjab) on 15th March 2020 and highest maximum temperature of 42.0°C had been recorded over Khargone (West Madhya Pradesh) on 31st March 2020.

Western Disturbances along with associated weather: Nine (9) numbers of Western Disturbances (WDs) have affected the North-West India during the month. These WDs have caused fairly widespread to widespread rainfall/snowfall with isolated intense rainfall activity over Western Himalayan Region. Two intense WDs among these have caused fairly widespread to widespread rainfall/thunderstorm activity along with isolated hailstorm over the adjoining plains (including Delhi) of NW India during the month. Remnants of Western Disturbance as well as movement of trough in low level westerlies have caused scattered to fairly widespread rainfall/thunderstorm activity over parts of North-East India. Confluence between westerlies and moist easterlies as well as strengthening of anticyclone over Bay of Bengal and

resultant enhanced moisture feeding had caused scattered to fairly widespread rainfall/thunderstorm activity over east and adjoining parts of central India along with isolated intense rainfall activity over these regions during the month. North-South oriented troughs/wind discontinuities have caused isolated to scattered rainfall/thunderstorm activity over parts of west and south peninsular India during the month. Isolated intense rainfall activity also observed over south peninsula during the month. Isolated hailstorm activity had been reported over parts of northwest, central and east India during the month.

Fog: Dense fog had been observed at isolated places over Himachal Pradesh, Haryana, Chandigarh & Delhi and East Madhya Pradesh in one or two days of the month.

Rainfall Scenario: The rainfall for the country as a whole for the month of March 2020 has been recorded as 44.6 mm which is 47% higher to its Long Period Average (LPA) i.e., 30.4

Heavy Rain: Heavy to Very heavy rainfall had been reported at isolated places over Telangana, Himachal Pradesh and Jammu & Kashmir on one day each during the month. Heavy rainfall had been reported at isolated places over Himachal Pradesh on five days; Uttarakhand, East & West Uttar Pradesh, Tamil Nadu, Puducherry & Yanam, Jharkhand and Odisha on two days each; over Jammu, Kashmir, Ladakh, Gilgit & Baltistan, East & West Rajasthan, Kerala & Mahe on one day each during the month.

Heavy / Very Heavy Rainfall Warning Skill: No. of Heavy/Very Heavy Rainfall Events (>64.4 mm) and Warning Skill (correctness in %) of spatial distribution in issued warnings during the month is given below:

warning issued for	No. of Heavy/Very Heavy Rainfall Events (>64.4 mm): 25
	Percentage correction (in %) for Rainfall >64.4mm
Day1 / 24 Hours	96%
Day2 / 48 Hours	97%
Day3 / 72 Hours	97%

Thundersquall & Hailstorm activity: Thundersquall & Hailstorm activity during the month (till 0830 IST of 31-03-2020) 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	23-03-20	Nil	Nil
2.	Northwest India	25	06-03-20	03(Jammu, (Churk, Kanpur City on 04-03-20), 02 (Fatehgarh, Hardoi 06-03-20), 03(Bhaderwah, Sundernagar, Dehradun 12-03-20), 03(Shimla, (Mukteshwar, Tehri 13-03-20), 02(Patiala, Safdarjung 13-03-20), 01(Patiala 21-03-20)	Nil
3.	Northeast India	17	03-03-20	01(Karbi Anglong District media Report 22-03-20)	Nil
4.	East India	22	03-03-20	01(Sriniketan on 02-03-20), 03(Gangtok, Tadong, Ranchi 03-03-20), 02(Gangtok on 04-03-20 & 20-03-20), 01(Darjeeling on 22-03-20), 01(Dum Dum on 23-03-20)	02(Paradeep, Keonjhar 19-03-20)
5.	Central India	27	29-03-20	02 (Gwalior, Ambikapur on 05-03-20), 02 (Ambikapur, Pendra Road 14-03-20), 02	Nil

				(Gondia, Jagdalpur 19-03-20)	
6.	West India	6	25-03-20	01(Mahableswar 25-03-20)	01(Aurangabad 25-03-20)

Note: The convective activities mentioned above had been predicted and corresponding warnings were issued about 4-5 days in advance of the occurrence of the event. In addition to that, nowcasts were also given by corresponding RMCs/MCs with respect to these events.

Heat Wave: No heat wave has been realised in the country during the month.

Scientists at Indian Institute of Tropical Meteorology indigenously designed and developed a new equipment and coined as '**mini-RS**' reception at the ground for obtaining the vertical profiles of the meteorological parameters using the radiosonde. This system also tracks the balloon. The equipment is tested and data validation is under process.

New technique/methodology has been developed and proposed to retrieve wintertime fog/aerosol/haze over Gangetic plains using high frequency surface measurements.

Bulletins/Warnings/Press Releases Issued: All India Weather Bulletins(124), All India inference and severe weather warnings(124), Press Releases related to (a)Western disturbance/intense rainfall activity/thunderstorm activity(3), (b) seasonal outlook for temperature during April to June 2020(1), (c)Observed Monsoon Rainfall Variability and Changes during Recent 30 years (1989-2018) (1)(d)Public Weather Bulletin(18), Nowcast Guidance Bulletins for severe weather (31), All India Weekly Weather Reports (4), Mountain weather bulletins including severe weather warnings for western and central Himalayan region(62), FDP Storm Bulletins (30).

Publications & Operational Reports issued: Daily All India Weather Summary and Weekly Weather Reports, El Nino Southern Oscillation (ENSO) and Indian Ocean Dipole(IOD) bulletin for the month of March, 2020 ,Hot Weather Season outlook 2020, 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

Geoscience Research

Seismological Observational Network

Observation Type	Target	Commissioned so far	Data reporting during the month
Seismic stations	115	115	106
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: 26 earthquakes were monitored in the Indian region out of which no event was 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 the event.

Ocean Observation System

Type of Platform	Target	Commissioned till November, 2019	Data received during November, 2019
Argo Floats *	200	374	156
Moored Buoys	16	22	17
Tide Gauges	36	36	30
High Frequency (HF) Radars	10	12	9
Acoustic Doppler Current Profiler (ADCP)	20	20	17
Tsunami Buoys	7	9	4
Wave Rider Buoy	16	28	13

*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	25
2	Ocean State Forecast (OSF)-Wave, Wind, Currents, SST, MLD and D20 forecasts	31
4.	Real time global ocean analysis (daily)	31
5.	Coral Bleaching Alert System	11

Detailed analyses of daily winds and currents for the coastal waters off Kerala and Mahe were provided to the Indian Coast Guard (Kochi). A high-resolution numerical model was run for the period December 2018 to November 2019 to generate the monthly and annual data for their pollution response preparedness exercise. Further, swell and wind forecast data was provided for the coast of Maharashtra (Ratnagari to Mumbai), during 09-11 March 2020 to facilitate the movement of the Indian Coast Guard hovercraft.

Capacity Building and Outreach

International Training Course on “Agro-Meteorology Forecasting, Translation and Dissemination” was successfully conducted during the period 09 March to 14 March 2020 at IMD, Pune. Ten (10) participants from Bangladesh attended this training.

Farmers Awareness Programme was organised at Bengaluru on 11.03.2020; demonstration was given on Meghdoot Mobile App to 46 farmers.

User's Workshop was organised on "Weather Forecast and Associated Services" at Nagpur on 7th March, 2020. This was inaugurated by Hon'ble Cabinet Minister of Road, Transport and Highway, Micro, Small and Medium Enterprises, Govt. of India. About 150 persons that include farmers, state and central governments officials etc. participated in the event.

Constitution Day was celebrated by arranging an Essay Competition on the theme of "Constitution Day" on 12 March 2020 at IITM, Pune. One day Hindi Workshop was arranged at IITM on this occasion on 13th March 2020. A Lecture in Hindi was delivered by Ms. Meenakshi Jadhav, STO, NCCS, Pune on the topic "Koshikavigyanaurmanavjeevan". The workshop was followed by Quiz Competition as a part of observance of Constitution Day on "Constitution of India & SambidhanDiwas".

On the occasion of World Meteorological Organization Day on 23rd March 2020, several special programme were aired on its theme Climate, Water & Agriculture and other meteorological topics at different channels of TV and radio including DD National (DD Science) & regional channels in which several IMD scientists

participated as experts

Subject	Publications			Ph.Ds		
	April- 2019 - February, 2020	March, 2020	Total	April- 2019 – February, 2020	March, 2020	Total
Atmospheric Sciences	163	14	177	4	2	6
Ocean Science and Technology	104	5	109	1	-	1
Polar Sciences	30	4	34	-	-	-

Geosciences and resources	21	-	21	2	-	2
Total	328	23	351	7	2	9

Publications

Utilization of Ocean Research Vessels during the month

Vessel	Days at Sea / Utilization	Maintenance/ Inspection /Scientific Logistics / Cruise Preparation	No. of Cruise
Sagar Nidhi	28	3	2
SagarManjusha	16	15	2
Sagar Tara	26	5	2
Sagar Anveshika	20	11	2
Sagar Kanya	0	31(drydock)	1
SagarSampada	24	7	1

Annex II

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

‘Prithvi Bhavan’, Lodhi Road
New Delhi-110003.

Dated, the 10th April, 2020

CERTIFICATE

(FOR THE MONTH OF MARCH, 2020)

It is certified that the detailed status regarding all the posts pertaining to Ministry of Earth Sciences have been uploaded on AVMS as on last day of the month of March, 2020. A summary of the status is given below:-

- | | |
|--|------|
| (a) 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 - 02

(Dr. Vipin Chandra)
Joint Secretary
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