

Ministry of Earth Sciences (MoES)
Summary of Important Developments –April,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
11	2

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:

1. **Long Range Forecast for Southwest Monsoon Season Rainfall during 2020** issued on 15th April indicates that southwest monsoon seasonal (June to September) rainfall over the country as a whole is likely to be 100% of the Long Period Average (LPA) of 88 cm with a model error of $\pm 5\%$. **South Asia Climate Outlook** indicates normal rainfall during the 2020 southwest monsoon season (June – September) as a whole over most parts of South Asia. Geographically, above-normal rainfall is most likely over the southern part and some areas of north-western parts of the region. However, below-normal rainfall is most likely over land areas around north Bay of Bengal and northern most parts of the region. Normal rainfall is most likely over the remaining areas.

2. **Normal dates of onset/progress and withdrawal of southwest monsoon over India has been revised.** The new monsoon advance dates over the states like Maharashtra, Gujarat, Madhya Pradesh, Chhattisgarh, Telangana, Andhra Pradesh, Odisha, Jharkhand, Bihar and parts of Uttar Pradesh are delayed by 3-7 days compared to existing normal dates. Over extreme northwest India, the monsoon arrives on 8th July compared to the existing date of 15th July. Monsoon withdraws from NW India almost 7-14 days later from the existing dates. However, there is no change in Monsoon onset of 1 June over Kerala and final withdrawal of monsoon on 15 October over south India. These new dates are relevant for agriculture, water and power management etc.

3. **Lower Atmospheric Research Facility using Unmanned Aerial System (LARUS) has been established** with basic infrastructure at Indian Institute of Tropical Meteorology (IITM), Pune. The instruments viz., Radiometers and Sky imagers at IITM, Pune and HACPL, Mahabaleshwar are being regularly operated and monitored online.

4. During the lockdown due to Covid-19, all **weather, climate, ocean, seismology observations and essential services** including the critical services like disaster management, agriculture, air quality and aviation services are continued. Relative Humidity and Temperature (Maximum & Minimum) data and forecast are being supplied to various agencies viz. NDMA, PMO, PSA in connection with the management of COVID-19.

5. In a significant development, concrete intake structure weighing 400 Metric Ton constructed in Amini island of Lakshadweep was transported to Chetlat island in floating condition through a distance of 65 km in the open sea and installed successfully for setting up a desalination plant.

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

7. **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 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)	*305 (705-400)	02 Jaspur (Uttarakhand) Muzaffarpur (Bihar)	268
Automatic Rain Gauge (ARG)	1356	--	351
GPS Sonde based RS/RW Stations	56	--	20
Doppler Weather Radar (DWR)	** 25	--	22
Ozone (Ozone Sonde + Total Ozone)	04	--	04
Surface Ozone (<u>Electrochemical Concentration Cell</u> method)	07	--	07
Nephelometer	12	--	12
Sky Radiometer	20	--	17
Black Carbon Monitoring Systems (Aethalometer)	25	--	23
Air Quality Monitoring System (SAFAR)	10 (Delhi) 10 (Mumbai) 10 (Ahmedabad)	--	09 (Delhi) 10 (Mumbai) 10 (Ahmedabad)
Hydromet. (IMD & Extra-departmental excluding AWS & ARG)	---	--	2681
Aviation	79	--	79
Radiation Stations	46	---	31

* Out of Total 705, 400 are outlived. ** Includes 2 Doppler Weather Radar of ISRO.

HP server (ftp and http services) for Data Collection and monitoring of AWS and ARG station all over India and at all airport MET Offices and coastal weather station for Data Collection and monitoring of HWSR and DCWIS station all over India installed and configured.

IMD prepared a new list of 169 names of tropical cyclones over north Indian Ocean with 13 names each from all the 13 WMO ESCAP Panel member countries including Bangladesh, India, Iran, Maldives, Myanmar, Oman, Pakistan, Qatar, Saudi Arabia, Sri Lanka, Thailand, United Arab Emirates and Yemen. This list will come into effect from the ensuing Cyclone Season, after the remaining one name in the existing list gets exhausted. A report in this regard was also prepared and submitted to World Meteorological Organization (<https://public.wmo.int/en/media/news/new-list-of-names-issued-tropical-cyclones-over-north-indian-ocean>).

On the special request, meteorological aviation services for New Zealand (NZ) de-partition flight from NZ to India and back was provided by Met Office, Mumbai airport as an alternate airport for operations for Delhi airport. This was well appreciated by all concerned agencies.

Monthly Weather Summary (April 2020)

a) Temperature Scenario:

The Mean Temp for the month for the country as a whole was 28.08°C; this was near normal (+0.04°C above normal). Heat wave frequencies during April 2020 are below normal with isolated heat wave conditions of 2-3 days reported in West Madhya Pradesh and Gujrat Region.

b) Western Disturbances and severe weather:

Nine numbers of Western Disturbances (WDs) against the normal of about 4-5 WD's have affected the Northwest India during the month. Movement of the Western Disturbances and their induced cyclonic circulations have caused fairly widespread to widespread rainfall/thunderstorm activity over Western Himalayan Region and scattered to fairly widespread rainfall/thunderstorm activity over adjoining plains of northwest India during the month. Isolated hailstorm activity also had been reported from these regions along with isolated intense rainfall activity over Himachal Pradesh & Uttarakhand, during the passage of the systems. In addition to this, passing of the systems have caused isolated dust storm activity also over Rajasthan. This enhanced activities led to lower maximum temperature to region.

Favourable position of anticyclone in the Bay of Bengal leading to continuous moisture incursion, strong wind convergence in the lower levels and favourable upper level features have caused fairly widespread to widespread rainfall/thunderstorm activity over Northeast and adjoining parts of East India along with isolated very intense rainfall activity. Very severe thunderstorms accompanied with squalls and hailstorms also had been reported from these regions during the month.

Under the influence of low level trough/wind discontinuity, isolated to scattered rainfall/thunderstorm activity had been reported from parts of West and Central India and scattered to fairly widespread rainfall/thunderstorm activity along with isolated very intense rainfall activity over South Peninsular India during the month. Isolated hailstorm activity also had been reported from parts of these regions along with thunderstorm activity.

Details of thunderstorm activity are given in the table below:

S. No.	Region	TS Days	Date of Maximum TS Activity	Hail Events	Squall Events
1.	South Peninsular India	25	09-04-20	01 (Madikeri SIKon 05-04-20) 01 (Bangalore AP on 16-04-20)	Nil
2.	Northwest India	24	26-04-20	01(Amritsar on 05-04-20) 01((Srinagar on 07-04-20) 01(Mukteshwar on 08-04-20) 02(Gulmarg, Tehrion 15-04-20) 04 (Batote, Katra, Patiala, Tehri on 18-04-20) 01(Kukernag on 19-04-20) 01(Muteshwer on 20-04-20) 01(Shimla on 21-04-20) 01(Ajmer on 25-04-20) 02(Shimla, Muteshwer on 27-04-20)	Nil
3.	Northeast India	28	20-04-20	01(Dhubri on 08-04-20) 02((Shillong, Agartala on 11-04-20) 02((Guwahati, Shillong on 18-04-20) (Media Report dated 23-04-20: Hail at Hliappui, Mizoram)	02(Tezpur, Guwahati on 09-04-20) 03(Dibrugarh, Tezpur, Guwahati on 15-04-20) 01(Agartala on 17-04-20) 01(Agartala on 20-04-20) 01(Tezpur on 23-04-20)
4.	East India	28	21-04-20	01(Gangtokon 01-04-20)	02(Malda, Coochbeharon 15-

				05 (Tadong, Gangtok, Coochbehar, Darjeeling, Jalpaiguri on 09-04-20) 02(Tadong, Gangtok on 11-04-20) 02(Coochbehar, Darjeeling, Jalpaiguri on 16-04-20) 01(Dum Dumon 23-04-20) 02(Darjeeling, Sriniketan on 26-04-20)	04-20) 02(Alipur on 18-04-20 & 21-04-20) 02(Malda, Alipur on 20-04-20) 02(Alipur, Dum Dum on 23-04-20) 01(Balasore on 24-04-20)
5.	Central India	25	27-04-20 & 28-04-20	02 ((Jagdalpur on 18-04-20 & 27-04-20) 01 ((Pendra Road on 25-04-20) 01 (Raipur on 26-03-20)	01(Nagpur on 28-04-20)
6.	West India	01	17-04-20	Nil	Nil

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.

Salient features of the weather in April are given below:

- (1) Enhanced Western Disturbances affecting NW India and adjoining areas.
- (2) Enhanced thunderstorm activity over Eastern India and Southern Peninsula.
- (3) Excess rainfall over the East India & southern peninsula.
- (4) No significant heat wave conditions are there in country.

c) **Rainfall Scenario:**

The rainfall for the country as a whole for the month of April 2020 has been normal as it recorded as 42.4 mm which is 8% higher than its Long Period Average (LPA) of 39.3mm.

- d) **Heavy Rain :** Heavy to Very heavy rainfall had been observed at isolated places over Kerala & Mahe and Odisha on two days each; Over South Interior Karnataka, Rayalaseema, Odisha, Sub-Himalayan West Bengal & Sikkim, Tripura and Arunachal Pradesh on one day each during the month. Heavy rainfall had also been observed at isolated places over Assam & Meghalaya on eight days; over Tamilnadu, Puducherry & Karaikkal and South Interior Karnataka on six days each; over Odisha on four days; over Coastal Andhra Pradesh & Yanam and Sub-Himalayan West Bengal & Sikkim on three days each; over Kerala & Mahe, Bihar, Chhattisgarh, Gangetic West Bengal and Arunachal Pradesh on two days each; over Himachal Pradesh, Uttarakhand, West Uttar Pradesh, Jharkhand, Nagaland, Mizoram, Manipur & Tripura, Rayalaseema and Coastal Karnataka on one day each during the month.

- e) **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): 61
	Percentage correction (in %) for Rainfall >64.4mm
Day1 / 24 Hours	94%
Day2 / 48 Hours	94%
Day3 / 72 Hours	94%

Bulletins/Warnings/Press Releases Issued: All India Weather Bulletins(120), All India inference and severe weather warnings(120), 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) Southwest Monsoon Season Rainfall During 2020(1), (d)New Normal Dates of Onset/Progress, Withdrawal of Southwest Monsoon(1), (e) new list of names of tropical cyclones over north Indian Ocean(1),(f)Current Weather Status and Outlook for next two weeks(5)Low Pressure Area Formation(3),Nowcast Guidance Bulletins for severe weather (30), All India Weekly Weather Reports (4), Mountain

weather bulletins including severe weather warnings for western and central Himalayan region(60), FDP Storm Bulletins (30).

Publications & Operational Reports issued: Daily All India Weather Summary and Weekly Weather Reports, Gridded Standardized Precipitation Index (SPI) & Standardized Precipitation Evapotranspiration Index (SPEI) at 0.5*0.5 degree resolution at 5 weekly 1,2,3 & 4 monthly time scales computed and maps of same timescales are being uploaded at weekly basis on IMD Pune website, CRS Research Report No. 001/2020 entitled “Development of a New (1.0° x 1.0°) Monthly Gridded Rainfall data set over South Asian Region (1981--2019)”

Geoscience Research

Seismological Observational Network

Observation Type	Target	Commissioned so far	Data reporting during the month
Seismic stations	115	115	107
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: 37 earthquakes were monitored in the Indian region out of which one 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 April, 2020	Data received during April, 2020
Argo Floats *	200	374	156
Moored Buoys	16	22	17
Tide Gauges	36	36	29
High Frequency (HF) Radars	10	12	9
Acoustic Doppler Current Profiler (ADCP)	20	20	18
Tsunami Buoys	7	9	4
Wave Rider Buoy	16	28	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)	30
2	Tuna Fishing Advisories	30
2	Ocean State Forecast (OSF)-Wave, Wind, Currents, SST, MLD and D20 forecasts	30
4.	Real time global ocean analysis (daily)	30
5.	Coral Bleaching Alert System	10

Marine Living Resources

The recent faunistic expedition to the Andaman Sea yielded first zoogeographical record of the reef-associated mantis shrimp *Gonodactylus drepanophorus* De Man, 1902 for the Indian waters. This species is previously known only from Indonesia. It was collected with a chain dredge at 53 meters depth in the Andaman Sea.

Topographic survey of Exclusive Economic Zone(EEZ)

Area covered: 22480 sq.

Subject	Publications			Ph.Ds		
	April- 2019 - March, 2020	April, 2020	Total	April- 2019 - March, 2020	April, 2020	Total
Atmospheric Sciences	177	20	197	6	-	6
Ocean Science and Technology	109	6	115	1	-	1
Polar Sciences	34	2	36	-	-	-
Geosciences and resources	21	-	21	2	-	2
Total	341	28	369	9	-	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	26	4	2
Sagar Manjusha	28	2	2
Sagar Tara	24	6	2
Sagar Anveshika	27	3	2
Sagar Kanya	26	4	2

Annex II

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

'Prithvi Bhavan', Lodhi Road
New Delhi-110003.

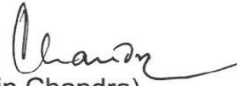
Dated, the 6 May, 2020

CERTIFICATE

(FOR THE MONTH OF APRIL, 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 April, 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 | - 03 |


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