

Ministry of Earth Sciences (MoES)
Summary of Important Developments –April, 2018

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 received for krill fishing which is under examination.</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
58	42

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 2018 Southwest Monsoon Seasonal (June-September) Rainfall indicates that the monsoon seasonal rainfall is likely to be 97% of the Long Period Average (LPA) of 89 cm with a model error of $\pm 5\%$. The forecast also suggests maximum probability for normal monsoon rainfall (96-104% of LPA) and low probability for deficient rainfall during the season.
2. Contract Agreements were signed on 6th April 2018 for establishing Low temperature Thermal Based Desalination (LTTD) based desalination plants at Kalpeni, Kiltan, Amini, Kadamat, and Chetlat in Lakshadweep islands with each having a capacity of producing 1.5 lakh litre of freshwater per day.
3. National Institute of Ocean Technology, an autonomous institute under Ministry of Earth Sciences signed an agreement for Transfer of Technology (ToT) of (i) Remotely Operable (underwater) Vehicle to Larson and Toubro Heavy industries (ii) Robo coastal observer to CT control technology through National Research and Development Corporation (NRDC), on 27th April 2018, at Hyderabad .
4. MaMeAt (Marine Met Atlas/ Visualisation) Tool for Indian Navy and Atlas of Marine Meteorology for Tropical Indian Ocean for Scientists developed by Indian National Centre for Ocean Information Services, an autonomous institute under Ministry of Earth Sciences was released.
5. SAFAR (System of Air Quality and Weather Forecasting And Research) mega emission inventory campaign for Delhi was launched on 12th April 2018 with a view to develop inventory covering different emission sources, with 400 m x 400 m resolution. Scientists from Indian Institute of Tropical Meteorology (IITM) and more than 100 graduate and post graduate students are participating and collecting the primary and secondary data from 26 different major and minor source sectors which contribute to Delhi air pollution.
6. Memorandum of Understanding (MoU) was signed by IITM, Pune with Sri Tulja Bhavani College of Engineering (STBCoE), Tuljapur, Maharashtra for setting up a mini observatory. This site will be used to monitor characteristics of seeded and natural clouds and aerosols.

Minimum Government, Maximum Governance:

Dissemination of Agromet. Advisories to users community through SMS and IVR technology is being continued in the country through Kisan Portal and under PPP mode. Presently 22.7 Million farmers in the country are getting advisories through SMS directly.

Adverse weather SMS warning are being sent through mobiles to State Govt. officials / Disaster related officials / Central Govt. Organization/Common men.

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	Data Reporting
Automatic Weather Station (AWS)	682	370
Automatic Rain Gauge (ARG)	1350	611
GPS Sonde based RS/RW Stations	43	43
Doppler Weather Radar (DWR)	25	24
Ozone (Ozone Sonde + Total Ozone)	05	05
Surface Ozone over Delhi (Electrochemical Concentration Cell)	07	07
Nephelometer	12	12
Sky Radiometer	20	16
Black Carbon Monitoring Systems (Aethalometer)	16	15
Air Quality Monitoring System (SAFAR-Delhi)	10	10
Hydromet. (IMD & Extra-departmental excluding AWS & ARG)	---	2319@
Aviation	76	76

@ Data received from various agencies viz. Air Force, Railways, Central Water Commission, State Agriculture, State Irrigation and India Meteorological Department (IMD)

Atmospheric Processes, Modeling and Services

Forecast for the 2018 southwest monsoon season (June to September) for rainfall over South Asia issued on 20th April 2018 indicates that normal rainfall is most likely during the 2018 southwest monsoon season (June– September) over most parts of South Asia. However, above normal rainfall is likely over some areas of east central India and southeastern parts of the region. Below-normal rainfall is likely over some areas of southern, northwestern and northeastern parts of South Asia.

Seasonal Outlook update for the upcoming Hot Weather Season (April-May- June- AMJ) indicates above normal sub-divisional average seasonal temperatures (maximum, minimum and mean) over most of the meteorological subdivisions of the country except the subdivisions of eastern, east central and southern parts for the country that are likely to experience slightly below normal seasonal temperatures. The AMJ seasonal average temperatures in most of the subdivisions are likely to be cooler than that of last year. Normal Heat Wave (HW) conditions are likely over core heat wave zone of the country.

Significant weather events:

Western Disturbances (WDs) and Associated Weather: Ten (10) active WDs passed across western Himalayan region and adjoining plains of northwest India during 1-2, 2-9, 8-9, 09-14, 15-16, 15-17, 16-19, 19-26, 24-27, and 27-29

April 2018. Out of 10 western disturbances, 5 caused fairly widespread to widespread precipitation and rest 5 caused scattered to fairly widespread precipitation over western Himalayan region and isolated to scattered over adjoining plains of northwest India.

Heat Wave: Heat wave conditions were observed at isolated places over Gujarat, Rajasthan, Konkan, Himachal Pradesh and Vidarbha on a few days and over Jammu & Kashmir, Madhya Pradesh, Madhya Maharashtra, Marathwada and Odisha on one or two days during this month. The highest maximum temperature of 45.9°C was recorded at Chandrapur (Vidarbha) on 20th April 2018 over the plains of the country during the month. Warm night conditions were observed at one or two pockets of West Madhya Pradesh on one day during the week.

Thunderstorm (TS) and Hailstorm Activity:

Thunder squall & Hailstorm activity during the month is given in the table below:

S. No.	Region	TS Day	Maximum TS Activity	Hail/squall
1.	South Peninsular India	28	01-04-18, 18-04-18 & 24-04-18	Thundersquall: 03(Bengaluru SIK on 02-04-18, 16-04-18, 24-04-18) Hailstorm: 02(Hyderabad: Telangana on 01-04-18, Belagavi Airport NIK on 06-04-18)
2.	Northwest India	26	21-03-18	Thundersquall: Nil Hailstorm: 07 {Batote(J & K), Pantnagar (UTRA) on 06-04-18}(Shimla, HP on 08-14-18)(Tehri, UTRA on 10-04-18, 20-04-18) (Sundernaga, HP on 27-04-18))(Dehraduni, UTRA on 28-04-18)
3.	Northeast India	29	05-04-18 &	Thundersquall: 07(Guwahati, Assam 05-04-18) (Agartala, Tripura 21-04-18) {Itanagar(Arunachal Pradesh), Guwahati(Assam, (Agartala)

			13-04-18	Tripura 25-04-18} Hailstorm: 01 (Guwahati, Assam on 14-02-18)
4.	East India	27	01-04-18	Thundersquall: 17 (Alipore, Digha(WB) 01-04-18) (Coochbehar (WB) 05-04-18, Alipore, Dumdum(WB) 07-04-18, Digha(WB) 14-04-18, Alipore, Dumdum (WB) 17-04-18, Alipore, Haldia, Kolkata(WB) 26-04-18 Hailstorm: 12 (Keonjhar, Odisha 04-04-18), (Coochbehar, Malda (WB) 05-04-18), (Jalpaiguri(WB) 12-04-18) (Gangtok/Jalpaiguri 13-04-18), (Coochbehar, Malda (WB) 21-04-18), (Keonjhar, Odisha 23-04-18), (Bankura (WB) 27-04-18), (Ranchi, Jharkhand 29-04-18), (Malda (WB) 30-04-18)
5.	Central India	23	09-04-18	Thundersquall: Nil Hailstorm: 02(Ambikapur, CHD: on 01-04-18, Mana (Raipur) on 14-04-18)
6.	West India	-	-	-

Rainfall in April, 2018

Rainfall during the month of April, 2018 was large excess in 7, excess in 9, normal in 10, deficient in 9, large deficient in 1 and no rain in 0 of 36 meteorological sub- divisions. The rainfall for the country as a whole for the month has been recorded as 38.4mm against the Long Period Average of 38.3 mm.

Daily All India Weather Summary and Weekly Weather Reports and are being brought out on routine basis.

All India Weather Bulletins & All India inference and severe weather warnings (120 each), Press Releases (02), Current Weather Outlook and Forecast for next two weeks (04) were issued

Sixty (60 Nos) Mountain Weather Bulletins including severe weather warnings for western and central Himalayan region were issued.

Electronic version of "Report on Cyclonic Disturbances over north Indian Ocean during 2017" was issued on 12th April 2018.

The reports on 'Forecast Demonstration Project (FDP) on landfalling cyclones over the Bay of Bengal during 2017' and 'Depression over the Arabian Sea during 15-17 April 2018' have been published.

Monthly El Nino–Southern Oscillation (ENSO) and Indian Ocean Dipole (IOD) Bulletin for April 2018 and Seasonal Climate Outlook for South Asia for the months of April to July 2018 were issued.

Geoscience Research

Seismological Observational Network

Observation Type	Target	Commissioned so far	Data reporting during the month
Seismic stations	116	113	106
GPS stations	40	28	21

Earthquake and Tsunami monitoring

Earthquake: 11 earthquakes were monitored in the Indian region out of which 1 event was greater than magnitude (M) of 5.0.

Tsunami: 3 major seabed earthquakes (M> 6) with a potential to generate tsunami were monitored. This information in respect of one event was provided within 12 minutes of occurrence and for the remaining 2 events between 12 to 15 minutes of occurrences

Ocean Observation System

Type of Platform	Target	Commissioned till	Data received during
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		April, 2018	April, 2018
Argo Floats *	200	323	153
Drifters*	150	108	4
Moored Buoys	16	20	20
Tide Gauges	36	35	27
High Frequency(HF) Radars	10	10	10
Current Meter Array	10	11	2
Acoustic Doppler Current Profiler(ADCP)	20	20	15
Tsunami Buoys	7	9	5
Wave Rider Buoy	16	17	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)	26
2	Tuna Fishing Advisories	26
2	Ocean State Forecast(OSF)-Wave, Wind, Currents, SST, MLD and D20 forecasts	30
3.	Near Real time global ocean analysis (5-day averaged)	6
4.	Real time global ocean analysis (daily)	30
5.	Coral Bleaching Alert System	10

Mapping Groundwater Potential Zones in Cauvery River Basin

The study was carried out by National Centre for Earth Science Studies(NCESS) in the Cauvery river basin (Basin Area 82283 km²) to delineate the groundwater potential zones by weighted overlay method utilizing a total of 12 thematic layers such as, Geology, Geomorphology, LULC, Lineament density, Drainage density, Rainfall, Soil, Slope, Roughness, Topographic Wetness Index, Topographic Position Index and Curvature.. An overall analysis reveals that about 65 % of the basin area falls under the moderate groundwater potential zone and 19 % under excellent to good and the remaining zones as low and poor groundwater potential zones. The groundwater potential zone developed in this study was cross-validated with the groundwater prospects map on 10 selected sub-watersheds and the overall mapping accuracy was found to be 85 %.

Capacity Building and Outreach:

The Department-related Parliamentary Standing Committee on Science & Technology, Environment & Forests visited Indian Institute of Tropical Meteorology(IITM) and its facilities viz. PRATYUSH HPC System and SAFAR Laboratory on 27th April 2018.

Twelfth Session of South Asian Climate Outlook Forum (SASCOF-12) was held at IITM during 19-20 April 2018. The Forum was hosted by IMD & IITM with the support of World Meteorological Organisation(WMO) & Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES). SASCOF-12 was preceded by a Capacity Building Training Workshop on climate data management and seasonal forecasting during 13-18 April 2018. Experts from the SASCOF member countries (Afghanistan, Bangladesh, Bhutan, India, Maldives, Myanmar, Nepal, Pakistan and Sri Lanka) as well as several regional and global experts participated in the forum.

Review Meeting of the Programs and Plan of Activities for 2018-19 was held during 26-27 April, 2018 at Hyderabad.

Under the auspices of Town Official Language Implementation Committee (TOLIC) a one day Hindi Seminar and self-composed poem recitation competition was organized at IITM on 10 April 2018. Representatives of 72 Central Government Offices stationed at Pune participated in the function. 29 participants presented their poems and out of which six winner participants (1st, 2nd, 3rd and 03 encouragement prizes) were felicitated with trophy and certificate.

A MoU was signed between IMD and Indian Council for Agricultural Research (ICAR) on 12th April, 2018 for establishment and operation of District Agromet Units in the country, collocated within Krishi Vigyan Kendra's at various districts.

Utilization of Ocean Research Vessels during the month

Vessel	Days at Sea / Utilization	Maintenance/ Inspection /Scientific Logistics / Cruise Preparation	No. of Cruise
Sagar Nidhi	15	15(dry dock/statutory survey)	1
Sagar Manjusha	18	12(4 days bad weather)	2
Sagar Purvi	14	16(9 days bad weather)	2
Sagar Kanya	18	12	2
Sagar Sampada	29	2	1

Publications in Science Citation Index(SCI) journals and PhDs awarded

Subject	Publications			Ph.Ds		
	April – March, 2017	April, 2018	Total	April – March, 2017	April, 2018	Total
Atmospheric Sciences	162	14		8	-	8
Ocean Science and Technology	53	5		2	-	2
Polar Sciences	18	0		1	-	1
Geosciences and resources	13	-		1	-	1
Total	246			12	-	12

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

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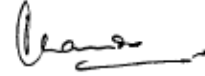
Dated, the 6th May, 2018

CERTIFICATE

(FOR THE MONTH OF APRIL, 2018)

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 April, 2018. A summary of the status is given below:-

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|-----|---|-------|
| (a) | The total number of posts required to be entered on AVMS | - 06 |
| (b) | Number of posts filled as on date | - 06 |
| (c) | Number of posts totally vacant as on date | - 00 |
| (d) | Number of posts under additional charge arrangement | - 00 |
| (e) | Number of posts that would fall vacant during the next 6 months | - 01* |



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Note: * The ACC has approved the re-employment on contract basis for the same incumbent for 2 years vide their communication No.22/52/2008-EO(SM.II) dated 27/03/2018. However formal order will be issued after completion of tenure on 30/05/2018 and joining of incumbent thereafter.