

Ministry of Earth Sciences (MoES)
Summary of Important Developments –August,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 |
|---|--|
| 42 | 44 |

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. The Cabinet Committee on Economic Affairs approved the scheme "Ocean Services, Modelling, Applications, Resources and Technology(O-SMART)" for implementation from the financial year 2017-2020 at a total cost of Rs. 1623 crore on 29th August, 2018.
2. According to Long Range Forecast for the Rainfall during Second Half (August –September) of the Southwest Monsoon-2018, issued on 3rd August 2018, the rainfall for the country as a whole during the second half of the season (August and September) is likely to be 95% of Long Period Average(LPA) with a model error of $\pm 8\%$. The all India average rainfall during the period June 01, 2018 to August 31, 2018 was 668.7 mm which is 94% of its Long Period Average (LPA) i.e. 714.1 mm.
3. A Cyclone Warning Centre (CWC) has been established at the Meteorological Centre, India Meteorological Department, Thiruvananthapuram to provide warnings and advisories for Kerala, Karnataka and Lakshadweep Islands in association with cyclonic disturbances over the north Indian Ocean and will be fully operational w.e.f. 01.10.2018.
4. Rainfall over Kerala had been exceptionally high during the month. The rainfall during the period from 1st to 9th August had been 758.6 mm against the normal of 287.6 mm which is above normal by 164%. Further, there were two spells of peak rainfall activity, around 8th to 10th August and around 14th to 17th August 2018 over Kerala. These intense spells had been mainly due to the strengthening of southwest monsoon current over Arabian Sea off Kerala coast in association with the formation of a low pressure system over North Bay of Bengal.

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 40 million farmers in the country are getting advisories through SMS directly.

Adverse weather SMS warnings 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 | 326 |
| Automatic Rain Gauge (ARG) | 1350 | 504 |
| 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) | --- | 2470@ |
| 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

Significant weather events:

Southwest monsoon: Southwest monsoon had been vigorous over Kerala on four days; over Telangana on three days; over Madhya Maharashtra, Marathwada, Gujarat Region, Saurashtra & Kutch, West Madhya Pradesh and Coastal Andhra Pradesh on two days each and over Chhattisgarh, Rayalaseema, Vidarbha, Himachal Pradesh, Coastal & South Interior Karnataka, Tamilnadu & Puducherry and Gangetic West Bengal on one day each during the month.

Southwest monsoon had been active over South Interior Karnataka on 11 days; over Andaman & Nicobar Islands, Odisha and Coastal Andhra Pradesh on 8-10 days; over Himachal Pradesh, Chhattisgarh, Jharkhand, Bihar, Uttarakhand, East Rajasthan, East Uttar Pradesh, East Madhya Pradesh, and Kerala for 5-7 days; over Arunachal Pradesh, Sub-Himalayan West Bengal & Sikkim, West Uttar Pradesh, Punjab, Gujarat Region, Marathwada, Coastal Andhra Pradesh, North Interior Karnataka, Jammu & Kashmir, Vidarbha and Telangana on 3-4 days and over Assam & Meghalaya, Gangetic West Bengal, Haryana-Chandigarh-Delhi, West Rajasthan, West Madhya Pradesh, Konkan & Goa, Madhya Maharashtra and Rayalaseema one or two days during the month.

Depressions: During the month of August 2018, two(2) Low Pressure Systems formed over North-West Bay of Bengal (BoB) and neighbourhood during 07-08 August and 15-17 August, 2018. Under the influence of 1st Depression, widespread rainfall activity heavy rainfall was observed over eastern parts of central India including Gangetic West Bengal, Odisha, Chattisgarh and over Madhya Pradesh and East Rajasthan during 6-10th August. While under the influence of 2nd Depression and its remnant low pressure area intense rainfall activity was observed over the northern

and central parts of the country extending from Odisha, Chattisgarh, Vidarbha, Telangana, Madhya Pradesh, Marathwada, north interior Karnataka, Konkan & Goa, Gujarat, East Rajasthan, and Western Ghats.

IMD mobilised all its resources to track the system and regular warnings with respect to track, intensity, landfall and associated adverse weather were issued to concerned central and state disaster management agencies, print & electronic media and general public. Its genesis, movement and associated adverse weather could be predicted well by IMD.

Western Disturbances and associated weather: During the month, there was one Western Disturbance which affected western Himalayan region from 26th to 30th August. However, there had been a few numbers of cyclonic circulations/troughs in mid-tropospheric levels passed over Jammu & Kashmir and neighbourhood and contributed for fairly-widespread to widespread rainfall activity over western Himalayan region during the month.

Thundersquall (TS) activity during the month is given below:

| S.No. | Region | TS Days | Maximum TS Activity | Squall |
|-------|------------------------|---------|---------------------|--|
| 1. | South Peninsular India | 24 | 09-08-18 | -- |
| 2. | Northwest India | 31 | 18-08-18 | -- |
| 3. | Northeast India | 29 | 15-08-18 & 20-08-18 | -- |
| 4. | East India | 30 | 19-08-18 | 04 (Port Blair on 01-08-18, 06-08-18, 30-08-18 & 31-08-18) |
| 5. | Central India | 26 | 15-08-18 | -- |
| 6. | West India | - | - | -- |

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.

Rainfall in August, 2018

Rainfall during the month of August, 2018 was large excess in 1, excess in 5, normal in 14, deficient in 16, large deficient in 0 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 241.4 mm against the Long Period Average of 261.3 mm.

Heavy rainfall: Heavy rainfall had been observed over Himachal Pradesh, Uttar Pradesh, West Madhya Pradesh, Chhattisgarh, Gangetic West Bengal, Bihar, Odisha, Vidarbha, Telangana, Coastal Andhra Pradesh, Coastal & South Interior Karnataka, Tamilnadu, Assam & Meghalaya, Kerala and also over some other parts of the remaining country on a few days during the month.

No. of heavy Rainfall (Events):421 (Heavy rainfall events: 281, very heavy rainfall: 140) Overall (>64.4mm)

| Lead Time | Skill (% correct) of spatial distribution of warnings during the month |
|-----------|--|
| 24 Hour | 72% |
| 48 Hour | 70% |
| 72 Hour | 70% |

Rainfall during South-West Monsoon 2018: The all India average rainfall during the period June 01, 2018 to August 31, 2018 was 668.7 mm which is 94% of its Long Period Average (LPA) i.e. 714.1 mm. Subdivision-wise distribution of rainfall for June-August 2018 is as under:

| Category | No. of Sub-divisions | Sub-div. % Area of Country |
|--------------------------------|----------------------|----------------------------|
| Large Excess (+60% or more) | 0 | 0 |
| Excess (+20% to +59%) | 01 | 1 |
| Normal (+19% to -19%) | 27 | 82 |
| Deficient (-20% to -59%) | 08 | 17 |
| Large Deficient (-60% to -99%) | 0 | 0 |
| No Rain | 0 | 0 |

| Region | Actual | Normal | % Departure from Long Period Average |
|------------------------|--------|--------|--------------------------------------|
| All India | 668.7 | 714.1 | -6% |
| East & Northeast India | 860.1 | 1141.7 | -25% |
| Northwest India | 480.8 | 502.9 | -4% |
| Central India | 786.1 | 794.1 | -1% |
| South Peninsula | 606.4 | 559.5 | +8% |

Modeling

A physically consistent downscaling from 12 km to 2.5 km with land surface condition, land-water contrast and terrain elevation for Numerical Weather Prediction and analysis Indian region was developed by National Centre for Medium Range Weather Forecasting (NCMRWF), an attached office of MoES. Further, a Real Time Meso-scale Analysis (RTMA) was developed for Indian region which is useful in Nowcasting.

Bulletins / Operational Reports/ Services

All India Weather Bulletins, all India weather inference and severe weather warnings 124 each; 7 Press Releases were issued. Out of these, 6 were related to heavy rainfall over different parts of India and one was related to monsoon rainfall forecast. Current weather outlook and forecast for next two weeks (05); All India weekly weather reports (05) each were also issued during the month.

Sixty two (62) mountain weather bulletins including severe weather warnings for western and central Himalayan region were issued during the month.

34 Nowcast Guidance Bulletins for severe weather were issued during the month.

Climate Diagnostics Bulletin of India for July 2018 was brought out.

ENSO bulletin for August 2018 and Seasonal Climate Outlook for South Asia for the months of August -November 2018 were issued. (www.imdpune.gov.in/Clim_Pred_LRF_New/Products.html)

NCMRWF is providing weather forecast data on daily basis up to next 72 hrs with effect from 31st Aug 2018 for Army Trekking Expedition to Sach Pass during 1-17 Sept 2018.

Geoscience Research

Seismological Observational Network

| Observation Type | Target | Commissioned so far | Data reporting during the month |
|------------------|--------|---------------------|---------------------------------|
| Seismic stations | 116 | 115 | 108 |
| GPS stations | 40 | 30 | 27 |

Earthquake and Tsunami monitoring

Earthquake: 16 earthquakes were monitored in the Indian region out of which 3 events were greater than magnitude (M) of 5.0.

Tsunami: 8 seabed earthquakes (M > 6) with a potential to generate tsunami occurred. This information was provided within 12 minutes of occurrence in respect of 7 events and after 20 minutes in respect of remaining event.

Ocean Observation System

| Type of Platform | Target | Commissioned till August, 2018 | Data received during August, 2018 |
|---|--------|--------------------------------|-----------------------------------|
| Argo Floats * | 200 | 323 | 143 |
| Drifters* | 150 | 108 | 2 |
| Moored Buoys | 16 | 22 | 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 | 19 | 8 |

*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) | 18 |
| 2 | Tuna Fishing Advisories | 17 |
| 2 | Ocean State Forecast(OSF)-Wave, Wind, Currents, SST, MLD and D20 forecasts | 31 |
| 3. | Near Real time global ocean analysis (5-day averaged) | 6 |
| 4. | Real time global ocean analysis (daily) | 31 |
| 5. | Coral Bleaching Alert System | 10 |

Ocean Technology

The near shore submerged reef as a triangular steel wedge, of 800 tonnes, with dimension 50m x 60m x 2.5m was successfully installed by National Institute of Ocean Technology, an autonomous institute under MoES at 2.5 m water depth off Puduchery coast as part of Beach restoration project on August 23, 2018..

NIOT in association with National Research Development Corporation (NRDC) has signed an MoU for technology transfer of Ocean Drifter and expandable CTD to Indian industries – M/s.Norinco, Mumbai, M/s.Astra Microwave, Hyderabad and M/s.Azista Industries Pvt. Ltd., Ahmadabad on 31.8.2018.

Capacity Building and Outreach

New website of Indian Institute of Tropical Meteorology has been made live on 24 August 2018 (www.tropmet.res.in), after performing the web security audit by CDAC. This newly developed dynamic website achieves the Guidelines for Indian Government website (GIGW) by using Content Management System (CMS), adding responsive features, inbuilt customized modules, implementing security audit measures. The website has more than 30 admin modules, 79 sub modules and ~500 static web-pages. This new version of website incorporates improvised navigation, with a better user experience for both mobile and desktop users and introduced many additional features to showcase the R&D of institute.

Indian Institute of Tropical Meteorology (IITM), Pune organized an International Workshop on Cloud Dynamics, Microphysics and Small Scale Simulation (IWCDMSS) during 13-17 August 2018. It was aimed to bring together talented young scientists, senior scientists and students across the world to exchange ideas and improve the understanding on the physics of clouds and their numerical simulations. Main theme of the workshop was to emphasize importance/application of small scale simulations in large scale models. Extensive discussions on the state-of-the-art small scale simulation models under Direct Numerical Simulation (DNS) and Large Eddy Simulation (LES) paradigms and their link to large scale models was conducted. About 28 speakers and 70 participants attended this workshop including 9 delegates from countries USA, Canada, South Korea and Japan.

INCOIS organised the National Workshop on Tsunami Standard Operating Procedure (SOP) on 10 August 2018. Total of 75 members from *National Disaster Management Authority (NDMA)*, MoES, Disaster Management Offices (DMOs) of

Andaman & Nicobar Islands, Andhra Pradesh, Gujarat, Goa, Karnataka, Kerala, Maharashtra, Odisha, Tamil Nadu and West Bengal; National Disaster Reserve Force (NDRF), Indian Navy, Coast Guards, Army and Port & Harbors participated in the workshop. Tabletop exercise was conducted to the participants.

Two short capsules of one day each were conducted at Hyderabad on "Utilization of Radar Products for Aviation" on 13th & 14th August 2018 for Indian Air Force Meteorological Personnels of Hakimpet & Dindigal, Hyderabad.

Three scientists from NCMRWF delivered training lectures at Air Force Administrative Collage (AFAC) in Coimbatore on 23-24 August 2018.

Under Government of India's Priority Scheme "Green Skill Development programme(GSDP)" implemented by Ministry of Environment, Forest And Climate Changes(MoEF& CC), IITM has started 2 courses based on theme (1)Emission Inventory and (2) Pollution Monitors: Air and Water. The Training Program inaugurated on 20 August 2018, is attended by 60 participants from all around India having age group of 20 to 60 years. This training comprises of practical hands-on session for 25-45 days in Air and water Pollution and Emission Inventory of Pollutants.

A one day Hindi Workshop was organized at NCMRWF on 27th Aug 2018.

IITM participated in the MoES stall at the Aavishkaar Exhibition "Vision Maharashtra Pune 2018" Mega Exhibition, held at Auto Cluster Exhibition Centre, Chinchwad, Pune during 3-5 August, 2018. The MoES stall comprised of IITM team and IMD team. MoES received a shield for its enthusiastic participation and good quality of scientific representation.

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 | 16(A frame and thruster work) | 1 |
| Sagar Manjusha | 6 | 25(bad weather, maintenance) | 1 |
| Sagar Purvi | 13 | 18(bad weather) | 1 |
| Sagar Kanya | 23 | 8 | 1 |
| Sagar Sampada | - | 31(dry dock) | - |

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

| Subject | Publications | | | Ph.Ds | | |
|------------------------------|--------------------|--------------|-------|--------------------|--------------|-------|
| | April - July, 2018 | August, 2018 | Total | April - July, 2018 | August, 2018 | Total |
| Atmospheric Sciences | 60 | 18 | 78 | - | - | - |
| Ocean Science and Technology | 18 | 4 | 22 | 1 | - | 1 |
| Polar Sciences | 9 | 1 | 10 | - | - | - |
| Geosciences and resources | 2 | 1 | 3 | - | - | - |
| Total | 89 | 24 | 113 | 1 | - | 1 |

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

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Annex II

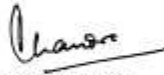
Dated, the 4th September, 2018

CERTIFICATE

(FOR THE MONTH OF AUGUST, 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 August, 2018. A summary of the status is given below:-

- | | | |
|-----|---|------|
| (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 | - 00 |


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