

**Ministry of Earth Sciences (MoES)**  
**Summary of Important Developments –October,2017**

**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 &amp; 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>There is no response from the private industries for a long time. Accordingly, it is proposed to close this item for monthly reporting. As and when the response is received, the same will be reported.</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
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8. **Information on the specific steps taken by the Ministry/Department for utilization of the 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

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#### Annex-I

##### **Important policy decision taken and major achievements:**

1) The India International Science Festival(IISF) 2017 was organized by Ministry of Earth Sciences in association with Vijnana Bharati (VIBHA) through National Institute of Ocean Technology involving Council of Scientific and Industrial Research, Department of Biotechnology, Department of Science and Technology, Ministry of Environment, Forests and Climate Change, Indian Institute of Technology, Chennai, Central Leather Research Institute and Anna University in Chennai during 13 - 16 October 2017. This megaevent was inaugurated by Dr. Harsh Vardhan, Hon'ble Minister of Science & Technology, Earth Sciences and Environment, Forests & Climate Change on 13<sup>th</sup> October 2017 at Anna University, Chennai. Sh. Y.S. Chowdary, Hon'ble Minister of State of Science & Technology and Earth Sciences, Government of India, Shri Abdul Latif Roshan, Hon'ble Minister of Higher Education, Afghanistan and Shri Yeafesh Osman, Hon'ble Minister of State for Science and Technology, Bangladesh were present on the occasion. The valedictory function was held on 16<sup>th</sup> October 2017 at Anna University presided over by His Excellency Shri M.Venkaiah Naidu, the Vice President of India. 16 major events including Science & Technology Ministers' Conclave, Mega Science EXPO, Sensitizing Youth to Flagship Programs of Government, Science Village, Bharat Nirman, Deep Ocean Research, Industry Academia Meet, National Science Teachers Meet, Women Scientists' and Entrepreneurs Conclave etc. were organized. Guinness world record was created for conducting "LARGEST BIOLOGY LESSON" wherein 1049 students from 23 schools participated.

2) The southwest monsoon withdrew from the entire country on 25<sup>th</sup> October 2017 against the normal date of 15<sup>th</sup> October 2017.

3) Northeast monsoon rains commenced over Tamilnadu & Pudducherry, Kerala and adjoining areas of Andhra Pradesh and Karnataka from 27<sup>th</sup> October 2017. As per long range forecast, the rainfall over south Peninsula (Tamil Nadu, Coastal Andhra Pradesh, Rayalaseema, Kerala and south interior Karnataka)

during the North-East monsoon season (October-December) is most likely to be normal (89% -111% of long period average (LPA) of 332.1mm.

4)The Mid-year review of all programmes of the Ministry was carried out at Indian Institute of Tropical Meteorology, Pune from 30-31 October, 2017.

#### **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 21.69 Million farmers in the country 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	336
Automatic Rain Gauge (ARG)	1350	624
GPS Sonde based RS/RW Stations	43	31
Doppler Weather Radar (DWR)	22	21
Ozone	15	05
Surface Ozone over Delhi ( <a href="#">Electrochemical Concentration Cell</a> )	07	07
Nephelometer	12	12
Sky Radiometer	12	08
Black Carbon Monitoring Systems (Aethalometer)	16	15
Hydromet. (IMD &Extra-departmental excluding AWS &ARG)	---	2340@
Aviation	74	74

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

Current Weather Instrument System (CWIS) system was made operational on 1<sup>st</sup> Oct. 2017 at Shirdi Airport during the inauguration of the airport by President of India.\

#### **Atmospheric Processes, Modeling and Services**

##### **Rainfall in October, 2017**

Rainfall during the month of October, 2017 was large excess in 3, excess in 10, normal in 7, deficient/ large deficient in 12 and no rain in 4 of 36 meteorological sub- divisions. The rainfall for the country as a whole for the month has been recorded as 81.7 mm (+1%) against the Long Period Average of 80.9 mm.

### Significant weather events

Deep Depression over Gangetic West Bengal (09-10 October, 2017) : A low pressure area formed over North Bay of Bengal(BoB) and adjoining south Bangladesh on 8<sup>th</sup> October 2017 morning was concentrated into a depression in the early morning of 9<sup>th</sup> over Gangetic West Bengal and adjoining north BoB. Moving northwestwards, it intensified into a deep depression (DD) in the morning of 9<sup>th</sup>. It moved nearly north-northwestwards and weakened into a depression around noon of 10<sup>th</sup> and into a well marked low pressure area over northeast Jharkhand and adjoining West Bengal in the evening of the same day. It became less marked on 11<sup>th</sup>. The system caused heavy to very heavy rainfall at isolated places over Gangetic West Bengal and heavy rainfall at isolated places over Bihar on 10<sup>th</sup> October and heavy rainfall at isolated places over Gangetic West Bengal, Jharkhand and Bihar on 11<sup>th</sup> October 2017.

Depression over Bay of Bengal (19-22 October, 2017): A low pressure area (LPA) formed over central BoB in the morning of 15<sup>th</sup> October was concentrated into a depression in the early hours of 19<sup>th</sup> over westcentral BoB. Moving nearly northwards, it crossed Odisha coast close to Paradeep in the late evening of 19<sup>th</sup>. The system started recurving and moved nearly eastwards for sometime from night of 20<sup>th</sup>. It then moved northeastwards across Gangetic West Bengal and Bangladesh. It weakened into a well marked low pressure area over northeast Bangladesh and adjoining Meghalaya & South Assam in the early morning of 22<sup>nd</sup> October. Under its influence, isolated heavy rainfall occurred over Odisha on 18<sup>th</sup>. It caused isolated heavy rainfall over Gangetic West Bengal and scattered heavy with isolated very heavy rainfall over Odisha on 19<sup>th</sup>. On 20<sup>th</sup>, Assam & Meghalaya experienced isolated heavy to very heavy rainfall, Gangetic West Bengal experienced scattered heavy and isolated very heavy to extremely heavy rainfall. The system caused, isolated heavy to very heavy rainfall with extremely heavy falls at few places over Assam & Meghalaya and widespread heavy to very heavy rainfall over Nagaland, Manipur, Mizoram & Tripura on 21<sup>st</sup> October.

India Meteorological Department (IMD) mobilised all its resources to track above two depressions and regular warnings with respect to track, intensity, landfall and associated adverse weather were issued to concerned central and state disaster management agencies, fishermen, ports, ships, print & electronic media and general public. Advisory bulletins were also issued to Bangladesh by Regional Specialised Meteorological Centre, New Delhi.

### Heavy Rainfall Verification for the month:

Total No. of Heavy Rainfall events(>64.4mm in 24 hrs ending at 0830 hrs IST of date): 40

Lead time of forecast→	24 hour	48 hour	72 hour
Percentage correct	87	84	84

### Thunderstorm Activity:

52 new stations were added on All India Nowcast Warning page on IMD website for issue of three hourly nowcast for severe weather (thunderstorm/hail/squall etc.). The total number of nowcast stations has increased to 307 with the addition of these new stations.

Nowcast Guidance Bulletins for severe weather (heavy rainfall and thunderstorms) were issued twice a day on daily basis and a total of 62 Bulletins were issued during the month.

Thunderstorm activity during the month (till 0830 IST of 31-10-2017) is given in the table below:

S. No.	Region	TS Days	Maximum Thunderstorm Activity
1.	South Peninsular India	29	6 <sup>th</sup> October
2.	Northwest India	05	1 <sup>st</sup> October
3.	Northeast India	22	8 <sup>th</sup> October

4.	East India	19	1 <sup>st</sup> October
5.	Central India	17	7 <sup>th</sup> October
6.	West India (Goa only)	9	-

Western Disturbance: Seven (7) active western disturbances passed across western Himalayan region and adjoining plains of northwest India during 4-8; 8-15; 16-17; 20-23; 23-25; 25-30 and 28-31 October 2017. Out of these seven western disturbances one or two western disturbances caused scattered to fairly widespread precipitation and remaining caused isolated rainfall activity over western Himalayan region and adjoining plains of northwest India.

Tropical cyclone Operational Plan (TCP-21) was prepared and sent to World Meteorological Organisation for publication on 30<sup>th</sup> October. The same is also available at RSMC website at the link: <http://www.rsmcnewdelhi.imd.gov.in/images/pdf/publications/tcp-21/tcp-21-2017.pdf>

Daily All India Weather Summary, Weekly Weather Reports and All India Special Daily Weather Reports for southwest monsoon season are being brought out on routine basis.

Climate Diagnostics Bulletin of India for September 2017 was brought out.

ENSO bulletin and Seasonal Climate Outlook for South Asia for the month of October 2017 was issued. ([www.imdpune.gov.in/Clim\\_Pred\\_LRF\\_New/Products.html](http://www.imdpune.gov.in/Clim_Pred_LRF_New/Products.html)).

### **Atmospheric Research**

An important study revealed existence of a threefold increase in widespread extreme rain events over central India during 1950–2015. The rise in these events is due to an increasing variability of the low-level monsoon westerlies over the Arabian Sea, driving surges of moisture supply, which is leading to extreme rainfall episodes across the entire central subcontinent. The homogeneity of these severe weather events and their association with the ocean temperatures underscores the potential predictability of these events by two-to-three weeks, which offers hope in mitigating their catastrophic impact on life, agriculture and property.

### **Geoscience Research**

#### **Seismological Observational Network**

Observation Type	Target for XII Plan	Commissioned so far	Data reporting during the month
Seismic stations	130	99	45
GPS stations	40	28	21

### **Earthquake and Tsunami monitoring**

Earthquake: 19 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 was provided within 12 minutes of occurrence.

### **Ocean Observation System**

Type of Platform	Target	Commissioned till October, 2017	Data received during October, 2017
Argo Floats *	200	298	136
Drifters*	150	103	2
Moored Buoys	16	19	18

Tide Gauges	36	34	26
High Frequency(HF) Radars	10	10	9
Current Meter Array	10	11	2
Acoustic Doppler Current Profiler(ADCP)	20	20	18
Tsunami Buoys	7	9	9
Wave Rider Buoy	16	17	10

\*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)	31
2	Tuna Fishing Advisories	27
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)	26
5.	Coral Bleaching Alert System	10

A MoU was signed by INCOIS with Kerala State Fisheries Department for effective dissemination of Ocean Information Services and capacity building activities for fishermen and fishery officials on October 24, 2017 at Thiruvananthapuram.

INCOIS provided detailed sea state forecasts for the Chennai-Port Blair route for the period 12-20 October 2017, at the request of passenger ship, Swaraj Dweep.

### **Polar expedition and studies:**

First batch of scientific expedition 2017-18 departed for Indian Station" Bharti" at Antarctica

Two patients were evacuated from Indian Station" Maitree", Antarctica.

The summer batch of the Indian Arctic expedition 2017-18 successfully conducted studies on persistent pollutants in the Arctic ecosystem, diversity of benthic organisms and atmospheric processes.

### **Acquisition of Polar Research Vessel**

Pre-bid meeting was held and amended document for Expression of Interest is uploaded on NCAOR website.

### **Ocean Technology**

The second offshore wind data collection platform was successfully installed at 10m water depth off Jakhau, Gulf of Kutch.

A MoU was signed by NIOT with Puducherry Smart City Development Ltd. (PSCDL) construction of second Reef by Puducherry Government with technical support of NIOT.

Pilot Project on Wave Measurement Evaluation and Test (PP-WET) was carried out to develop procedures and protocols for the continuous testing and evaluation of wave measurements. The inter-comparison of wave parameters exhibited good correlation.

### **Topographic surveys of Exclusive Economic Zone:**

Area covered during the month: 31,500 sq. km(approx.)

### **Capacity Building and Outreach:**

Sixth workshop under technical cooperation between National Oceanic and Atmospheric Administration (NOAA), USA and Ministry of Earth Sciences(MoES) on "Development of Predictive Capabilities on Marine Fisheries and Harmful Algal Blooms in Indian Seas" was held at Indian National Centre for Ocean Information Services(INCOIS) during September 26-29, 2017 with five participants from NOAA and eight participants from collaborating MoES institutions – Centre for Marine Living Resources and Ecology(CMLRE) and INCOIS. The workshop was focused on familiarizing Indian scientists with bioacoustics and observation systems in the USA.

International workshop on Strengthening Early Warning for Disaster Risk Reduction for Himalayan Agriculture was jointly organized by UNESCO, India Meteorological Society (IMS) and IMD at Palampur during 25-26 October, 2017.

3rd Upper Air Network performance (UANP) workshop conducted at New Delhi during 4 – 5th October, 2017.

A cleanliness drive was held from 12-18 October to clear the junk/waste material in INCOIS as a part of Swachh Bharat Mission Activity.

IMD released a documentary film on "Early warning System of Tropical Cyclones" in eight regional languages (Tamil, Gujarati, Malayalam, Odiya, Telugu, Kannada, Marathi and Bangla). The same is available on RSMC website at the link <http://rsmcnewdelhi.imd.gov.in/images/documentary-film.pdf>

Hindi version(तड़ित: कारण, नुकसान एवं सावधानियाँ) and Oriya versions of a publication by IITM "Lightning: Causes, damages & Precautions" were released during the "All India Rajbhasha Hindi Conference and Workshop", organized by Parivartan Jan Kalyan Samiti – Delhi, at Puri, Odissa on 12–14 October 2017.

Vigilance Awareness Week (30<sup>th</sup> October to 4<sup>th</sup> Nov, 2017) was observed with integrity pledge on 30/10/2017 amongst officers and staff members at Delhi HQ and attached / subordinates offices and autonomous institutes of Ministry of Earth Sciences.

Rashtriya Ekta Divas pledge was administered on 31/10/2017

#### **Utilization of Ocean Research Vessels during the month**

Vessel	Days at Sea / Utilization	Maintenance/ Inspection /Scientific Logistics / Cruise Preparation	No. of Cruise	No. of Port Calls / Port Stay/ Statutory survey
Sagar Nidhi	26	5	2	-
Sagar Manjusha	17	14	4	-
Sagar Purvi	6	23	2	-
Sagar Kanya	27	4	1	-
Sagar Sampada	25	6	1	-

A cruise was undertaken jointly with NOAA to deploy two T-Flex mooring and eight Argos floats and retrieval of a glider onboard ORV Sagar Nidhi.

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

Subject	Publications			Ph.Ds		
	April – September, 2017	October, 2017	Total	April – September, 2017	October, 2017	Total
Atmospheric Sciences	70	12	82	4	-	4
Ocean Science and Technology	25	2	27	-	1	1
Polar Sciences	9	3	12	1	-	1
Geosciences and resources	11	1	12	--	-	--
Total	115	18	133	5	1	6