

**Summary of Important Developments –August, 2016**

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>

4. **Cases of sanction for prosecution pending in the Ministry for more than three months:** Nil

5. **Particulars of cases in which there has been a departure from the Transaction of Business rules of established policy of the Government:** Nil

6. **Status of implementation of e-Governance :** Under process/ being implemented

7. **Status of Public grievances:**

No. Of Public Grievances redressed during the month	No. Of Public Grievances pending at the end of the month
36	32

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.

## Annex-I

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

"A MoU has been signed on 30th August 2016 on the Membership of the International Continental Scientific Drilling Program (ICDP) between Ministry of Earth Sciences, Govt. of India and the Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences, for a period of five years. The MoU will facilitate engagement of internationally renowned experts from ICDP to accomplish scientific deep drilling and associated investigations in the Koyna region. As a part of the membership agreement, ICDP will provide technical/ operational support, facilitate capacity building in terms of manpower training in key scientific areas".

Letter of agreement was signed between IMD and Indian Air Force for exchange of meteorological data and technical collaboration on 16th August, 2016, for operational activities.

A letter of agreement (LoA) was signed with Maharashtra Airport Development Company Ltd. (MADC) on 26th August, 2016 for providing Aviation Meteorological Services at Shirdi airport.

### **Minimum Government, Maximum Governance:**

Agromet Advisories are being communicated to 193 lakh farmers of the country through mobile SMS.

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 Medias.

### **Atmospheric Observation Systems Network**

Observation Type	Target	Commissioned up to August, 2016	Data reporting
Automatic Weather Station (AWS)	675	682	397
Automatic Rain Gauge(ARG)	1350	1341	446
GPS Sonde	10	43	43
Doppler Weather Radar(DWR)	23	19	19
Ozone	17	15	15
Black Carbon Monitoring Systems (Aethalometer)	16	16	16
Other Rain Gauges excluding ARG and AWS @	-	-	2457
Aviation	--	72	72
Agro-meteorology	267	264	160

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

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

#### **Monthly Weather Summary (August, 2016):**

#### **Depression over West Bengal (9-14 August 2016)**

A low pressure area formed over northwest Bay of Bengal (BoB) and adjoining areas of West Bengal on 8th morning concentrated into a depression over coastal areas of West Bengal and neighbourhood on 9th afternoon and into a deep depression over south Bangladesh and neighbourhood on 10th morning. It then moved west-northwestwards

and lay over Gangetic West Bengal and adjoining Jharkhand on 11th morning as a deep depression. It weakened into a depression over north Jharkhand and neighbourhood in the afternoon of 11th. It lay over southwest Jharkhand on 12th and weakened into a well marked low pressure area over southwest Bihar and neighbourhood in the morning of 13th. It further weakened into a low pressure area over southeast Uttar Pradesh and neighbourhood in the morning of 14th. It persisted over the same region on 15th and became less marked on 16th. Under its influence, southwest monsoon was active/ vigorous over Gangetic West Bengal and Jharkhand on 11th & 12th and over Uttar Pradesh during 15th – 17th. Heavy to Very Heavy rainfall occurred over Gangetic West Bengal and Jharkhand regions on 11th & 12th, Uttar Pradesh and Bihar during 15th -17th August. Bulletins were issued regularly and concerned state governments were informed about the rainfall situation.

#### **Deep Depression over Bay of Bengal(BoB) (16-21 August 2016)**

A low pressure area formed over northeast BoB and neighbourhood in the morning of 15<sup>th</sup> August, 2016. It concentrated into a well marked low pressure area over northwest BoB and neighbourhood in the morning of 16th and into a depression over north BoB in the evening of 16th. Moving northwestwards it concentrated into a deep depression over northwest BoB in the afternoon of 17th and crossed West Bengal coast between Digha and Diamond Harbour around 1700 hours IST of 17th. Continuing its northwest to west-northwest journey, it weakened into a depression in the night of 20th and into a well marked low pressure area over east Rajasthan and adjoining west Madhya Pradesh in the morning of 21st August. Under its influence, heavy to very heavy rainfall occurred over Gangetic West Bengal & Odisha on 18th, Chhattisgarh & east Madhya Pradesh on 19th & 20th and west Madhya Pradesh on 20th & 21st and east Rajasthan during 20th to 24th with extremely heavy rainfall over Jharkhand on 18th, east Madhya Pradesh on 19th, west Madhya Pradesh and east Rajasthan on 20th & 21st. Bulletins were issued regularly and concerned state governments were informed about the rainfall situation.

The southwest monsoon was active and vigorous over many subdivisions of west, central, northwest and east India on a few days. Isolated extremely heavy falls (more than 20 cm) also observed over Madhya Maharashtra, Konkan & Goa, East Rajasthan, Madhya Pradesh, Jharkhand, East Uttar Pradesh, Chhattisgarh, West Bengal and Odisha on one or two days.

Six numbers of western disturbances affected western Himalayan region & adjoining Plains.

Skill (% correct) of Spatial warnings during August 2016 is as follows:

Lead Time	Rainfall		
	Heavy Rainfall	Very Heavy Rainfall	overall
24 Hour	69	87	76
48 Hour	66	85	72
72 Hour	69	85	72

Assessment of monsoon rainfall for August 2016 made in June 2016 ( $104\% \pm 9\%$ ) could not be realised at the end of 31<sup>st</sup> Aug. 2016 due to unexpected contributions on account of Indian Ocean Dipole and other intra-seasonal variability forcings associated with monsoon rainfall over India. This year monsoon onset over Kerala was delayed by about a week; however it covered the entire country close to its normal time (by 15<sup>th</sup> July 2016). The accumulated rainfall for the entire season from 1<sup>st</sup> June 2016 to 1<sup>st</sup> September 2016 is deficient only by 02%. The details of rainfall(%) are given below:

Month	Monthly Rainfall	Accumulated Rainfall w.e.f. 1 <sup>st</sup> June to 31 <sup>st</sup> August 2016
June	-11%	-11%
July	+07%	00%

August	-09%	-03%
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No moisture stress has been reported so far with respect to any major kharif crops from the rainfed areas such as Rajasthan, Madhya Pradesh, Madhya Maharashtra, Marathwada, Vidarbha, North Interior Karnataka, Rayalaseema, Telangana and Gujarat as these areas has been receiving good rainfall.

South Peninsula has received 36% above normal rainfall during last week of August thus enhancing the prospects of the crops in the region further.

### Country Level Scenario in terms of Kharif Crops and Reservoir Storage:

Reported acreages of crucial crops such as pulses and oilseeds are extremely good. These very areas have been receiving good rainfall. The spatial and temporal (across space and time) spread too has been good.

Current year's storage in the major reservoirs monitored by the Central Water Commission (CWC) of the M/o Water Resources is higher than the last year's storage by 12% and the normal storage (long term average) by 2%.

This year's area coverage of kharif crops so far is higher by 45.7 lakh ha. than the area coverage during the corresponding period of last year and by 48.8 lakh ha. than normal area coverage ( long term average) during the same period.

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### Modelling and simulation

Assimilation of MeghaTropique-ROSA dataset was made operational in the National Centre For Medium Range Weather Forecasting(NCMRWF) global data assimilation system from 15 August 2016.

Ensemble Kalman Filter (EnKF) based high resolution (~12 km) ensemble analysis system has been developed as an initiative towards meeting NitiAyog commitments. The new system was tested for two cycles (00 and 06 UTC of 15 Aug 2016).

### Monsoon Weather Reports, Maps and Crop Yield Forecast

Rice Yield Forecast for 13 states (Andhra Pradesh, Assam, Bihar, Chhatisgarh, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Odisha, Punjab, Telangana, Uttar Pradesh and West Bengal) at F1 stage for Kharif 2016 communicated to Mahalanobis National Crop Forecast Centre (MNCFC), as per our work under FASAL Program.

Climate Diagnostics Bulletin of India for June & July, 2016 has been brought out.

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

Four weekly and cumulative Standardized Precipitation Index (SPI) maps were prepared for the weeks ending 3<sup>rd</sup>, 10<sup>th</sup>, 17<sup>th</sup>, 24<sup>th</sup>, and 31<sup>st</sup> July 2016 and supplied for use in Agromet. Advisory Services Bulletin.

Four (4) Drought Outlook Maps based on Aridity Anomaly Index for drought monitoring for the weeks ending 5<sup>th</sup>, 12<sup>th</sup>, 19<sup>th</sup> and 26<sup>th</sup> August 2016 and Five weekly aridity anomaly maps & reports were prepared for the week ending 29<sup>th</sup> July, 5<sup>th</sup>, 12<sup>th</sup>, 19<sup>th</sup> and 26<sup>th</sup> August 2016 and uploaded on IMD Pune website.

Three biweekly aridity maps and reports for the period 16<sup>th</sup> to 29<sup>th</sup> July 2016, 30<sup>th</sup> July-12<sup>th</sup> August and 13<sup>th</sup> to 26<sup>th</sup> August has been prepared.

## **Geoscience Research**

### **Seismological Observational Network**

Observation Type	Target for XII Plan	Commissioned so far	Data reporting during the month
Seismic stations	130	99	66
GPS stations	40	28	22

### **Earthquake and Tsunami monitoring**

**Earthquake:** 30 earthquakes were monitored in the Indian region out of which 4 events were greater than magnitude (M) of 5.0.

**Tsunami:** 4 major seabed earthquake(M> 6) with a potential to generate tsunami were monitored. This information was provided within 12 minutes of occurrence of the earthquakes.

### **Ocean Observation System**

Type of Platform	Target	Commissioned till August, 2016	Data received during August, 2016
Argo Floats	200	280	131
Drifters	150	96	16
Moored Buoys	16	19	18
Tide Gauges	36	30	26
High Frequency(HF) Radars	10	10	9
Current Meter Array	10	11	5
Acoustic Doppler Current Profiler(ADCP)	20	21	18
Tsunami Buoys	7	9	6
Wave Rider Buoy	16	15	15

\*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	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)	20
5.	Coral Bleaching Alert System	11

Hon'ble Minister of Science & Technology and Ministry of Earth Sciences inaugurated **SARAT**- The **S**earch **A**nd **R**escue **A**id **T**ool at XV National Maritime Search and Rescue (NMSAR) Board. This tool helps to narrow down the search area when an object/person lost at sea.

A new service was launched that facilitates the indication of Eco sensitive zones, Potential Fishing zones, Fishing avoidance zone during the event of an oil spill.

Ocean State Forecast was provided for ORV Sagar Kanya cruise in the Bay of Bengal (NIOT, Chennai) during the period 05-13 Aug 2016 (for Mining System Equipment trials at a depth of about 500 m).

### **Swath Bathymetric Survey of Exclusive Economic Zone**

An area of 9300 square km was surveyed with acquisition of bathymetric data.

### **Polar Science and Expedition**

XXVIII Annual General Meeting of Council of Managers of National Antarctic Programs (COMNAP) followed by a workshop on “Winter-over Challenges” was conducted during 16-20 August 2016 at hotel Cidade de Goa. Representatives of national Antarctic programs, observers and exhibitors of about 35 nations attended the AGM and workshop. India's nominee has been elected as the Vice Chair of the COMNAP Executive Committee (EXCOM) for tenure of 3 years.

A team of twelve scientists led by Director, National Centre for Antarctic and Ocean Research(NCAOR) participated in the 34th SCAR (Scientific Committee on Antarctic Research) 2016 Open Science Conference at Kuala Lumpur, Malaysia from 22-31 August, 2016. The delegates included research students and scientists. The researchers submitted seven oral presentations and four posters in various sessions of the conference. The best poster award for Asia region was won by Mr. Shridha Jawak.

A field campaign in Himalaya with the following major activities was conducted: (a). Monitoring of installed stakes over Sutri Dhaka, Batal, Samudra Tapu, Gepang Gath, Kunjam and Bara Shigri glacier; (b). Data collection and maintenance of Automatic weather Station over Sutri Dhaka base camp and glacier; (c). Collection of Water Level data from all four locations (Discharge site of Sutri Dhaka, Passanger Ropeway site of Chandra River, Koksar and Tandi- a stretch of 120 km); (d). Construction and monitoring of Research field station, which is under progress at Sutri Dhaka base.

### **Ocean technology**

Pumping subsystem test platform sea trials at ORV Sagar Kanya was successfully completed at 82 m to 264 m water depth as a part of development of deep sea mining system.

### **Capacity Building and Outreach**

The Indian Institute of Tropical Meteorology (IITM) and the Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy jointly organized an Advanced School on Earth System Modelling (ESM) during 18-27 July 2016, followed by a Workshop on Climate Change & Regional Impacts over South Asia during 28-29 July, at IITM, Pune, India.. The summer school aimed at training the participants on the different components of the Earth System i.e., atmosphere, ocean, land, cryosphere, atmospheric chemistry and aerosols, ocean biogeochemistry etc. The newly developed IITM Earth System Model (IITM ESM) was the focus of the School. There were about 8 International faculties, 19 IITM and National faculties, 12 International and 29 National participants attended the ESM School. The ESM School was followed by a Workshop on Climate Change & Regional Impacts over South Asia during 28-29 July 2016.

Considering ongoing scientific advances in the area of cloud and precipitation research, the facilities and vision for future research the ICCP Commission selected Indian institute of Tropical Meteorology (IITM) as its next venue for conducting the conference for the year 2020. The International Commission on Clouds and Precipitation (ICCP) conducts International Conference on Clouds and Precipitation (ICCP) after every quadrennial which is attended by 500-600 scientists working specifically on cloud & precipitation.

One day workshop on Tsunami Standard Operating Procedure was conducted on 2 August 2016, at ESSO-INCOIS. The workshop focused on the details on the measures required and the procedure for the upcoming tsunami mock drill, IOWave2016 to be held during 7-8 September 2016. A Tabletop Exercise and Interactive tour of the Warning Centre also was arranged. Over 100 officials participated from the Navy, Coastguard, NDRF, Coastal District Collectors, etc.

Twenty-two officers representing 13 countries at the "Community Based Disaster Management" at National Institute of Rural Development and Panchayati Raj made a field visit to the INCOIS campus on 3 August 2016.

Fifteen Agricultural officers from various Southern Coastal states attending training at Extension Education Institute ,Rajendernagar also made a field visit on 4th August.

A training program on "Basic techniques for the isolation and identification of health indicator bacteria from marine environment" was organized at Marine Microbial Reference Facility (MMRF), of MoES at Regional Center of NIO, Kochi during 22 – 26<sup>th</sup> August, 2016.

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

Vessel	Days at Sea / Utilization	Maintenance/ Inspection /Scientific Logistics / Cruise Préparation	No. of Cruise	No. of Port Calls / Port Stay/ Statutory survey
Sagar Nidhi	30	1	1	-
Sagar Manjusha	17	9	1	5
Sagar Purvi	0	31(Hull plate repair and cruise preparation)	0	0
Sagar Kanya	16	15	1	-
Sagar Sampada	2	28(Dry dock)	1	1

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

Subject	Publications			Ph.Ds		
	April-July,2016	August, 2016	Total	April-July,2016	August, 2016	Total
Atmospheric Sciences	69	17	86	1	-	1
Ocean Science and Technology	20	3	23	1	-	1
Polar Sciences	16	3	19	-	-	-
Geosciences and resources	6	-	6	-	-	-
Total	111	23	134	2	-	2