

**Ministry of Earth Sciences(MoES)**  
**Summary of Important Developments –December, 2015**

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 Cabinet/ Cabinet Committees:**

S.No.	Number of Cabinet/ Cabinet Committee decisions pending for compliance	Proposed action plan/timelines	Remarks
1.	Dt. 8/5/2009 India's submission for an Extended continental Shelf prepared by Ministry of External Affairs(MEA)	First partial submission based on Article 76 of the UNCLOS, was submitted in UN on 11 May, 2009. Second partial submission requires new geophysical survey. The data processing, analysis, Interpretation and report preparation will be completed by December 2016. The claim would be submitted by April, 2017.	The 1 <sup>st</sup> phase of geophysical survey has been completed.
2.	Dt. 27/8/2009, Continuation of programme Polar Science:-Expedition to Antarctica	Planned yearly summer (Nov.-April) and winter expeditions(Nov-Nov) to Indian Station Maitree and Bharti to be continued during the XII Five year Plan period. Winter team would continue to stay at the stations till next summer.	--
3.	Dt 19/5/2010 Acquisition of Ice-class Research Vessel	Note for Cabinet approved. The selected shipyard has sought change in certain terms and conditions of tender which were not acceptable and a decision of retendering was taken.	--
4.	Dt. 26/4/2012 Monsoon Mission	Under implementation till April, 2017. Studies on the existing model and incorporation of changes in the model to improve skill by 2015. Setting up an Indian model by 2017 followed by investigations.	--
5.	Dt.28/11/2013 Scientific Deep Drilling in Koyna	Under implementation till 2018. This includes preparatory phase for scientific deep drilling in 2014, setting up of research lab by 2016, setting up of borehole observatory, scientific deep drilling and coring, geological logging by 2018 followed by scientific investigations	--
6.	Dt.28/11/2013 International Ocean Discovery Programme- MoU between National Science Foundation and Ministry of Earth Sciences	Under implementation till 2019. This includes signing of MoU in Aug. 2014, Scientific Drilling for Indian Proposal in Arabian sea in 2015 followed by investigations.	--

**4. 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>	--

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

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

**7. Status of implementation of e-Governance : Under process**

**8. Status of Public grievances:**

No. Of Public Grievances redressed during the month	No. Of Public Grievances pending at the end of the month
<b>67</b>	<b>55</b>

## Annex-I

### Important policy decision taken and major achievements:

#### 1) Operational forecast for the 2016 Winter Rainfall over North India :

The 2016 winter season rainfall over north India is most likely to be normal (85% - 115%) of the Long Period Average (LPA) with a tendency to be in the positive side of the normal.

2) For the first time, IITM Pune and India Meteorological Department (IMD), Ministry of Earth Sciences, are jointly conducting an observational fog campaign at the Indira Gandhi International Airport (IGIA) and at ICAR institute at Pusa during this winter season (2015-16). This campaign is being done on a pilot mode, which will be repeated during next 2-3 winter seasons. The main objective of the proposed field campaign is to study the characteristics and variability of fog events over Delhi and its associated dynamics and thermodynamics and cloud microphysics. In addition to IITM and IMD, the Indian Air force (IAF), Indian Council for Agricultural Research (ICAR) and Indian Institute of Science Education and Research (IISER) Mohali are also participating in the observational campaign. For modeling efforts, IITM, NCMRWF Noida and IIT Delhi are involved.

3) An International Symposium on "Dynamics of the Indian Ocean: Perspective and Retrospective" was organized during 30 November to 4 December 2015 at National Institute of Oceanography Goa to mark 50th year of the completion of International Indian Ocean Expedition (IIOE). This international symposium was a grand success in which a total of 559 abstracts were presented by scientists from more than 38 different countries. The culmination of the symposium was marked by launch of the second International Indian Ocean Expedition (IIOE-2) by Hon. Minister of State for Science and Technology and Earth Science. The first expedition of IIOE-2 was also flagged off by the Hon Minister at Marmugao Port, Goa on 4 December 2015.

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

Agromet Advisories were communicated to 68.7 lakhs farmers of the country through mobile SMS including Kisan Portal and Public Private Partnership (PPP) mode.

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

All scientists are being encouraged to correspond with peer scientists of government organizations so as to develop self-expertise and fast implementation.

### **Atmospheric Observation Systems Network**

Observation Type	Target	Commissioned up to December, 2015	Existing	Total	Data reporting
Automatic Weather Station (AWS)	550	555	125	680	442
Automatic Rain Gauge (ARG)	1350	1291	--	1291	494
GPS Sonde	10	38	1	39	39
Doppler Weather Radar (DWR)	23	17	5	22	15

Ozone	17	15	--	15	15
Other Rain Gauges excluding ARG and AWS	-	-	--	-	2364@
Aviation	--	72	--	72	72
Agro-meteorology	267	264	--	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**

#### **Rainfall in December, 2015**

Rainfall was excess in 6, normal in 3, deficient/scanty in 22 and Nil in 5 of 36 meteorological sub- divisions. The actual rainfall for the month was 15.1 mm against the normal rainfall of 16.6 mm.

#### **Modelling**

The latest high resolution (T382 spectral resolution) research version of the coupled model (CFS Version 2) has been used to generate the experimental forecast for the **2015 NE Monsoon season** rainfall (over Indian region) using the **November** initial conditions with **42** ensembles. The prediction indicated **above normal rainfall** and **above normal temperatures** over India for November, December, January, and December, January, February months. Predictions are made available at <http://www.tropmet.res.in/monsoon/seasonal/>

The ensemble prediction system based on the NCMRWF Unified Model (NCUM) has been made operational. The ensemble prediction system which has 44 members at a horizontal resolution of about 33km generates 10 days forecasts every day.

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

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

Climate Diagnostics Bulletin of India for November 2015 was brought out.

Four weekly and cumulative Standardized Precipitation Index (SPI) maps were prepared for the weeks ending 2, 9, 16, 23, 30 and supplied for use in Agromet Advisory Services Bulletin.

ENSO bulletin and Seasonal Climate Outlook for South Asia were issued.

Three (03) Drought Outlook Maps for NE Monsoon season for 5 sub-divisions for the weeks ending on December 02, 09 and 16 were prepared and uploaded on IMD Pune website.

Two (02) Biweekly Aridity Reports and maps for the period 19 Nov. to 2 Dec. and 03 to 16 Dec., 2015 and three (03) Weekly Aridity Anomaly Reports and maps for the weeks ending on December 2, 9 & 16 have been prepared and issued.

### **Geoscience Research**

#### **Seismological Observational Network**

Observation Type	Target for XII Plan	Commissioned so far	Data reporting during the month
Seismic stations	130	89	48
GPS stations	40	27	22

#### **Earthquake and Tsunami monitoring**

**Earthquake:** 11 earthquakes were monitored in the Indian region out of which 3 events were 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 of the earthquake for all the events.

### **Ocean Observation System**

Type of Platform	Target	Commissioned till December, 2015	Data received during December, 2015
Argo Float	200	270	126*
Drifters	150	144	7*
Moored Buoys	16	19	18
Tide Gauges	36	25	18
High Frequency(HF) Radars	10	12	10
Current Meter Array	10	11	5
Acoustic Doppler Current Profiler(ADCP)	20	21	16
Tsunami Buoys	7	7	7
Wave Rider Buoy	16	11	9

\*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.	Ocean State Forecast(OSF)-Wave, Wind, Currents, SST, MLD and D20 forecasts	30
4.	Near Real time global ocean analysis (5-day averaged)	4
5.	Real time global ocean analysis (daily)	20
6.	Coral Bleaching Alert System	10

### **Marine Living Resources (MLR)**

An unusual swarming of Polychaetes belonging to the families *Amphinomidae*, *Aphroditidae* and *Sabellariidae* were observed off Vizag (17°07.3870 N, 83°21.7320 E) at a depth of 500m during the recent cruise (no:346) to Bay of Bengal.

Two new records of crustaceans were reported from Agatti Islands, Lakshadweep (10.853 N, 72.193 E): decapod crab, *Ashtoret picta* (Hess, 1865) and coral shrimp *Coralliocaris superba* (Dana, 1852) as part of regular biodiversity survey. In Indian waters they are reported only from Andaman Sea.

### **Capacity Building and Outreach**

National Fog workshop was organised during 14-15 Dec., 2015 to understand formation, intensity and dissipation of fog.

A 5 days' workshop on "Ocean Data Utilization and Ocean Observation System" was conducted for students of University of Hyderabad and IIT Bhubaneswar during 08 - 12th December, 2015.

The National Marine Geo-scientific Data Centre (NMGDC) at NCAOR, established in 2009 to cater to the day to day requirements of voluminous geophysical data management pertaining to the Indian Legal Continental Shelf (LCS) Program has been awarded CSI-Nihilent E-Governance Award for 2015 under Sustenance Category.

**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	27	4	2	0
Sagar Manjusha	14	11	1	6
Sagar Purvi	8	11	1	14
Sagar Kanya	6	25	1	0
Sagar Sampada	25	6	2	0

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

Subject	Publications			Ph.Ds		
	April– November 2015	December, 2015	Total	April– November 2015	December, 2015	Total
Atmospheric Sciences	7	21	28	1	1	2
Ocean Science and Technology	13	1	14	2	0	2
Polar Sciences	9	1	10	-	-	-
Geosciences and resources	23	1	24	-	-	-
	52	24	76	3	1	4

**Other matters**

National Institute of Ocean Technology (NIOT) and Project Directorate, Integrated Coastal and Marine Area Management(PD- ICMAM) at Chennai were severely affected due to the heavy rainfall and subsequent flooding during 1-4, December, 2015. Service/repair and procurement of faulty equipments are under process.