

Ministry of Earth Sciences(MoES)
Summary of Important Developments –November, 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 st 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 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 Koyana	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 & 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
6	51

Annex-I

Important policy decision taken and major achievements

A well marked low pressure area over southwest Bay of Bengal during 12-18 November 2015 caused heavy to extremely heavy rainfall along north coastal Tamil Nadu during the 24-hr ending 0300 UTC of 16th and isolated heavy to very heavy rainfall over north coastal Tamil Nadu on the other days.

A trough of low pressure that formed over southeast Bay of Bengal on 28th November 2015, moved westwards and subsequently became a low pressure area caused heavy to extremely heavy rainfall along north coastal Tamil Nadu and Puducherry during 28 November to 03rd December 2015.

Both the events were correctly predicted. Scattered heavy to very heavy rainfall with isolated extremely heavy rainfall Heavy rainfall warnings were issued for Tamil Nadu and Puducherry 3-4 days in advance.

The First WMO Workshop on "Operational Climate Prediction" was organized by World Meteorological Organization (WMO), Geneva and Indian Institute of Tropical Meteorology (IITM), during 9-11 November 2015 at IITM Pune. Operational scientists involved in climate prediction activities from different countries have participated in the workshop and deliberated on future scope of climate services and prediction activities.

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

Nowcasting based on Doppler Weather Radar(DWR) products of Kolkata and Visakhapatnam and Cloud Top Temperature(CTT) of IMD site are, disseminated to all users including Special Relief Commissioner(SRC), Odisha State Disaster Management Authority(OSDMA), concerned collectors and both electronic and print media.

Atmospheric Observation Systems Network

Observation Type	Target	Commissioned up to November, 2015	Existing	Total	Data reporting
Automatic Weather Station (AWS)	550	555	125	680	437
Automatic Rain Gauge(ARG)	1350	1291	--	1291	536
GPS Sonde	10	37	1	38	38
Doppler Weather Radar(DWR)	23	17	5	22	14
Ozone	17	15	--	15	15
Other Rain Gauges excluding ARG and AWS	-	-	--	-	2235@
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 November, 2015

Rainfall was excess in 8, normal in 3 and deficient/scanty in 25 of 36 meteorological sub- divisions. The actual rainfall for the month was 39.9 mm against the normal rainfall of 29.7 mm.

Northeast monsoon rainfall activity was above normal during the month of November.

Significant Weather event

Two Extremely Severe Cyclonic Storm 'Chapala' from 28th October to 4 November 2015 and 'MEGH' from 5th to 10th November 2015 formed over Arabian Sea. A deep depression formed over southwest Bay of Bengal and crossed north Tamil Nadu coast in the evening of 9th November, it caused widespread rainfall activity over Tamil Nadu, Kerala and South Interior Karnataka during 8-11 November with heavy to very heavy rainfall at a few places and extremely heavy at isolated places.

Modelling

National Centre for Medium Range Weather Forecasting(NCMRWF) has implemented modules for generation Global and Regional NWP products including EPSGrams for several important cities in the countries over the domain 10 deg S to 45 deg S and 45 deg E to 110 deg E as a part of WMO project on Severe Weather Forecast Demonstration Project-Bay of Bengal (SWFDP-BOB) purported to provide severe weather guidance on cyclones, heavy rainfall, thunderstorm, waves etc.

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 October 2015 was brought out.

Four weekly and cumulative Standardized Precipitation Index (SPI) maps were prepared for the weeks ending 4, 11, 18, 25 and supplied for use in Agromet Advisory Services Bulletin.

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

Four Drought Outlook Maps for the weeks of 29 Oct – 4 Nov. , 5 – 11 Nov. ,12 – 18 Nov, 19 – 25 Nov. for NE Monsoon season for 5 sub-divisions were prepared and uploaded on IMD Pune website.

Two Biweekly Aridity reports for the period 22 Oct.-4 Nov. and 5 - 18 Nov. 2015, have been prepared and sent as inputs to Ministry of Agriculture.

Crop yield forecast for cotton were developed and communicated for the states of Gujarat, Haryana, M.P., Maharashtra, Punjab, Rajasthan, Karnataka and Telangana and for sugarcane for the states of Gujarat, Haryana, Maharashtra, Karnataka and U.P. to Mahalanobis National Crop Forecast Centre (MNCFC), Department of Agriculture & Cooperation (DAC), Ministry of Agriculture, New Delhi.

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: 25 earthquakes were monitored in the Indian region out of which 13 events were greater than magnitude (M) of 5.0.

Tsunami: 7 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 November, 2015	Data received during November, 2015
Argo Float	200	270	130*
Drifters	150	144	7*
Moored Buoys	16	32	19
Tide Gauges	36	25	19
High Frequency(HF) Radars	10	12	12

Current Meter Array	10	11	5
Acoustic Doppler Current Profiler(ADCP)	20	21	16
Tsunami Buoys	7	7	6
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)	6
5.	Real time global ocean analysis (daily)	30
6.	Coral Bleaching Alert System	10

Polar Science and Cryosphere

As a part of XXXV Indian Scientific Expedition to Antarctica, three batches of Indian scientists reached Maitree, Indian Station at Antarctica.

Swath Topographic Survey of Exclusive Economic Zone(EEZ)

About 18000 sq. km of mutibeam survey was carried out during the month.

Visit of Parliamentary Standing Committee

Parliamentary Standing Committee Members on Science & Technology and Environment and Forests visited hatchery of Centre for Marine Living Resources and Ecology, an attached office of MoES at Agatti during 23rd to 24th Nov 2015.

International Collaboration

Dr. Yushi Morioka of Japan Agency for Marine-Earth Science Technology (JAMSTEC) delivered a lecture on "Interannual-decadal climate variability in the southern Indian Ocean" at IITM during his visit to IITM, Pune (period: 22-29 November 2015) as a part of cooperation between MoES and JAMSTEC.

Capacity Building and Outreach

Indian Institute of Tropical Meteorology, Pune in association with the National Remote Sensing Center (ISRO), Hyderabad organized a Joint Conference on AsiaFlux Workshop 2015 and ISPRS TC WG VIII/3: Weather, Atmosphere and Climate Studies on "Challenges and Significance of Ecosystem Research in Asia to better Understand Climate Change" at IITM Pune during Nov 22-29, 2015. About 170 delegates, mostly from the Asian countries have participated in the workshop.

International Training Centre for Operational Oceanography (ITCOcean) organized a training course on "Indian Ocean Dynamics : From the Large-scale Circulation to Small-scale Eddies and Fronts" during November 16-27, 2015. Prof. Julian McCreary from University of Hawaii, USA along with other Indian scientists conducted this course. Twenty eights researchers from various institutes of India and seventeen scientists from ESSO-INCOIS attended this course.

Forecast Demonstration Project (FDP) on land falling cyclones over Bay of Bengal and Arabian Sea was conducted from 15 October to 30 November with collaboration with sister scientific organisation of Ministry of Earth Sciences

like NCMRWF and INCOIS; academic institutions like IIT Delhi and IIT Bhubaneswar; and other organisations of Govt. of India such as Indian Air Force, Indian Navy and ISRO.

Inception Winter South Asian Seasonal Climate Outlook Forum (WinSASCOF-1) meeting and 1st Climate Services Users Forum for Agriculture (CSUF-Ag1) were organised by IMD, IITM, WMO and RIMES, Bangkok from 14th to 16th Oct.2015 at Chennai. Delegates from all the countries of SASCOF region, WMO, RIMES, Global Climate Production Centres of WMO and national institutes participated in the events.

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	3	0
Sagar Manjusha	23	8	4	0
Sagar Purvi	19	12	1	0
Sagar Kanya	23	8	1	0
Sagar Sampada	19	11	1	0

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

Subject	Publications			Ph.Ds		
	April–October 2015	November, 2015	Total	April–September 2015	November, 2015	Total
Atmospheric Sciences	95	16	111	5	-	5
Ocean Science and Technology	34	3	37	4	1	5
Polar Sciences	11	-	11	11	-	-
Geosciences and resources	6	1	7	-	-	-
	146	20	166	9	1	10