

**Earth System Science Organization(ESSO)**  
**Ministry of Earth Sciences(MoES)**  
**Summary of Important Developments –April, 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 for which process of chartering a seismic vessel is continuing. Depending on fair weather conditions, survey is expected to be over by June, 2015. The data processing, analysis, Interpretation and report preparation will be completed by December 2016. The claim would be submitted by April, 2017.	--
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 agreement is being finalised.	--
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 buy 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
20	37

### Important policy decision taken and major achievements

The first stage South-West monsoon rainfall forecast for the 2015 for the country as a whole issued by Hon'ble Minister on 22<sup>nd</sup> April 2015 is likely to be 93% of the Long Period Average (LPA) with a model error of  $\pm 5\%$ . The LPA of the season rainfall over the country as a whole for the period 1951-2000 is 89 cm.

The Corner Stone Laying function of ESSO-National Institute of Ocean Technology(NIOT), Nellore by Dr. Harsh Vardhan, Hon'ble Union Minister for Science and Technology & Earth Sciences, presided by the Chief Minister of Andhra Pradesh Shri.N.Chandra Babu Naidu, in the presence of Hon'ble Minister for Urban Development Mr.Venkaiah Naidu and Hon'ble Minister for State for Science & Technology Mr.Y.S.Chowdary, was held on 25<sup>th</sup> April 2015. All the infrastructure necessary for conducting sea trials will be developed in this Seafront campus.

### Minimum Government, Maximum Governance

Agromet Advisories were communicated to 102.7 lakhs farmers of the country through mobile SMS and IVR (Interactive Voice Response) Technology.

### Atmospheric Observation Systems Network

Observation Type	Target	Commissioned up to April, 2015	Existing	Total	Data reporting
Automatic Weather Station (AWS)	550	554	125	679	486
Automatic Rain Gauge(ARG)	1350	1291	--	1291	742
GPS Sonde	10	10+5 <sup>\$</sup>	1	16	16
Doppler Weather Radar(DWR)	15	10	5	15	11
Ozone	17	15	--	15	15
Other Rain Gauges excluding ARG and AWS	-	-	--	-	2013@
Aviation	--	72	--	72	72
Agro-meteorology	267	264	--	264	160

<sup>\$</sup> Installed at Ahmedabad, Bhopal, Nagpur, Kolkata, Bhubaneshwar covering the monsoon trough region

<sup>@</sup> 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 April, 2015

Rainfall was excess in 43, normal in 1, and deficient/scanty in 1 of 36 meteorological sub- divisions.

The actual rainfall for the winter season was 66.7 mm with departure of +74% from the normal.

#### Modelling

The Velocity Azimuth Display (VAD) Wind Profiles from Indian Doppler Weather Radar are now being assimilated operationally in the ESSO-NCMRWF global forecasting systems.

Assimilation of INSAT-3D sounder radiance data (temperature and humidity) commenced from 15 April 2015. The observational system experiment (OSE) results showed neutral to slightly positive impact on forecast skill.

The "Extended Range Prediction of Active/Break Spells" (ERPAS) program of ESSO-Indian Institute of Tropical Meteorology(IITM) was awarded the ISO 9001:2008 Certification for generating and disseminating experimental real time forecast of active/break spells during summer monsoon season over entire country and homogeneous regions;

continually improving on the prediction accuracy with the help of ongoing research, and publishing the research results.

Climate Data Portal of Centre for Climate Change Research has been identified as a nodal Server for the Earth System Grid Federation (ESGF) for dissemination of climate change information for the South Asian region available from Coordinated Regional Climate Downscaling Experiment (CORDEX). This data portal will also be used for disseminating the CMIP6 projections generated by ESSO-IITM in the near future. The ESGF is an international collaboration with a current focus on serving the World Climate Research Programme's (WCRP) Coupled Model Intercomparison Project (CMIP) and supporting climate and environmental science in general.

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

Crop yield forecast were developed for onion for the state of Karnataka and Gujarat.

Daily All India Weather Summary and Weekly Weather Reports have been brought out.

Four Weekly and Cumulative Standardized Precipitation Index (SPI) maps were prepared for the weeks ending April 1, 8, 15 & 22.

Climate Diagnostics Bulletin of India for February 2015, Winter Season (January- February) 2015 and Annual Summary 2014 have been brought out.

### **Geoscience Research**

#### **Seismological Observational Network**

Observation Type	Target for XII Plan	Commissioned so far	Data reporting during the month
Seismic stations	130	84	54
GPS stations	40	26	20

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

Earthquake: 86 earthquakes were monitored in the Indian region out of which 28 events were greater than magnitude(M) of 5.0.

An earthquake of great intensity (Magnitude 7.9) occurred on 25<sup>th</sup> April 2015 at 11:41 hrs IST in Nepal (about 80 Km NW of Kathmandu). The event was severely felt in all northern, eastern and some parts of central India. This earthquake has caused major damage in the epicentral region in Nepal and also affected some areas in India in UP, Bihar and northeastern states. The main shock was followed by number of aftershocks which includes two major aftershocks of Magnitudes 6.6 and 6.9 on 25<sup>th</sup> and 26<sup>th</sup> April, 2015 respectively. Till 30.4.2014 more than 70 significant aftershocks have been detected and located by the national seismological network. The hypo-central parameters of the earthquake events have been disseminated to all concerned government agencies related with initiating relief and rescue operations. The information is also posted on IMD's website for public use. The aftershock activity is being continuously monitored and information on significant aftershocks is being transmitted to all the concerned agencies.

Tsunami: 2 major seabed earthquakes (M> 6) with a potential to generate tsunami was monitored. This information was provided within 12 minutes of occurrence of the earthquakes for one event, and after 20 minutes of occurrence for the remaining event.

#### **Ocean Observation System**

Type of Platform	Target	Commissioned till April, 2015	Data received during April, 2015
Argo Float	200	263	126*
Drifters	150	144	9*
Moored Buoys	16	26	19
Tide Gauges	36	25	21
High Frequency(HF) Radars	10	10	6

Current Meter Array	10	11	5
Acoustic Doppler Current Profiler(ADCP)	20	21	16
Tsunami Buoys	7	7	2
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	<b><i>Integrated Potential Fishing Zone (PFZ) advisories</i></b> (Sea Surface Temperature(SST), Chlorophyll., wind)	29
2.	<b><i>Tuna Fishing Advisories</i></b>	20
3.	<b><i>Ocean State Forecast(OSF)</i></b> -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

The Online Oil Spill Advisory (OOSA) version 2.0 providing trajectory predictions for continuous and instantaneous spills on the west coast was developed..

### **Polar Science and Expedition**

The Antarctic Expedition vessel MV Ivan Papanin with 39 members including 09 Helicopter crew led by Dr S. Saini arrived in Cape Town on 04 April 2015. The two Helicopters and the vessel were de-chartered on 04 April and 05 April 2015 respectively.

A two-member team from ESSO-National Centre for Antarctic and Ocean Research(NCAOR) visited Ny-Ålesund, Arctic during this month to resume the ongoing glaciological and biogeochemical studies of the glaciers at Ny-Ålesund during the late Spring of 2015. More than 32 line km of Ground Penetrating Radar data (by using 400 M-Hz, 200 M-Hz & 80 M-Hz frequencies) was collected to estimate the snow accumulation and ice depth of Vestre Broggerbreen glacier. Snow sampling from Austre Broggerbreen, vestre Broggerbreen and Loverbreen glaciers was also carried out for chemical characterization of the snow.

### **Ocean Technology**

The Corner Stone Laying function of ESSO-National Institute of Ocean Technology(NIOT), Nellore by Dr. Harsh Vardhan, Hon'ble Union Minister for Science and Technology & Earth Sciences, presided by the Chief Minister of Andhra Pradesh Shri.N.Chandra Babu Naidu, in the presence of Hon'ble Minister for Urban Development Mr.Venkaiah Naidu and Hon'ble Minister for State for Science & Technology Mr.Y.S.Chowdary, was held on 25<sup>th</sup> April 2015. All the infrastructure necessary for conducting sea trials will be developed in this Seafront campus.

B-10 biodiesel fueled ESSO-NIOT vehicle was successfully operated from Nellore to Chennai on 25<sup>th</sup> April 2015

### **Capacity Building and Outreach**

A delegation of State Oceanic Administration, China visited Ministry of Earth Sciences and ESSO-NCAOR, Goa from 20-22 April, 2015 to explore the possibility of collaboration in ocean sciences and related fields.

A training course on various aspects of Numerical Weather Prediction was organized for officers of Indian Air Force during 6-10<sup>th</sup> April 2015.

A three day training on the usage of 350 TF HPC (Bhaskara) was organized for all the scientific staff of ESSO-National Centre for Medium Weather Range Forecasting(NCMRWF).

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

Vessel	Days at Sea / Utilization	Maintenance/ /Scientific Preparation	Logistics/ Inspection Cruise	No. of Cruise	No. of Port Calls / Port Stay/ Statutory survey
Sagar Nidhi	11		13	1	6
Sagar Manjusha	23		7	3	0
Sagar Purvi	19		11	2	0
Sagar Kanya	--		30(drydock)	0	0
Sagar Sampada	24		6	2	0

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

Subject	Publications			Ph.Ds		
	April 2014– March 2015	April, 2015	Total	April 2014– March 2015	April, 2015	Total
Atmospheric Sciences	160	10	170	8	-	8
Ocean Science and Technology	61	2	63	1	-	1
Polar Sciences	9	1	10	2	-	2
Geosciences and resources	24	1	25	--	-	--
Total	254	14	268	11	-	11