

**Ministry of Earth Sciences (MoES)**  
**Summary of Important Developments –April, 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<br/> <b>PROPOSAL FOR KRILL FISHING</b></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> | --      |

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 |
| <b>43</b>   | <b>24</b>  |

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

**i) Important policy decision taken and major achievements:** The first stage long range forecast for South west monsoon rainfall for the country as a whole, released on 13 April, indicates that the monsoon seasonal rainfall is likely to be 106% 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.

Seasonal (up to one season) and Extended Range (up to 20 days) Forecasts for Heat Wave during the Hot weather Season (April to June) have been made operational in co-ordination with Indian Institute of Tropical Meteorology (IITM) Pune and is now made available on the IMD website. A specialized link on the IMD website is made operational for heat wave information like prevailing heat wave conditions, Maximum and minimum temperatures and their anomalies, heat wave warnings for next 5 days and 15 days heat wave forecast across the country.

On 27th April, 2015, India became a member country of the International Energy Agency- Ocean Energy Systems (IEA-OES) by signing of the Implementing Agreement.

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

Agromet Advisories were communicated to 112 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.

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 April, 2016 | Data reporting |
|--|--------|--------------------------------|----------------|
| Automatic Weather Station (AWS)                | 675    | 679                            | 427            |
| Automatic Rain Gauge(ARG)                      | 1350   | 1307                           | 441            |
| GPS Sonde                                      | 10     | 40                             | 39             |
| Doppler Weather Radar(DWR)                     | 23     | 19                             | 18             |
| Ozone  | 17     | 15                             | 15             |
| Black Carbon Monitoring Systems (Aethalometer) | 16     | 16                             | 16             |
| Other Rain Gauges excluding ARG and AWS        | -      | -                              | 2432           |
| 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**

**Thunder storms/squalls:** Thunder squall with hail over Cachar, Morigaon, Barpata, Kamrup districts of Assam on 11th April, 2016 and Thunder squall over Nalbari, Tinsukia, Darrang, Golaghat, Sibsagar, Kamrup (Districts of Assam) on 29th April, 2016 damaged many houses, institutions, cattle, huge quantities of standing crops and uprooted many trees and electric poles disrupting power supply.

Based on the 44-member NCMRWF Ensemble Prediction System (NEPS), a new set of ensemble based early warning products for extreme high/low surface temperatures have been made operational. This system makes use of the historical model forecast climatology (2007-2013).

### Rainfall in April, 2016

Rainfall during the month of April, 2016 was excess in 1, normal in 4, deficient/scanty in 27 and no rain in 4 of 36 meteorological sub- divisions. The rainfall for the country as a whole for the month of April, 2016 has been recorded as 30.8 mm (-19%) against the normal rainfall for the month as 38.3 mm.

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

Crop yield forecast for onion (Rabi) for the states of Gujarat and Karnataka for 2015-16 was developed. 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 on April 6, 13, 20 & 27.

Climate Diagnostics Bulletins of India for February 2016 and Winter Season (Jan.-Feb., 2016) have been published.

### Geoscience Research

#### **Seismological Observational Network**

| Observation Type | Target for XII Plan | Commissioned so far | Data reporting during the month |
|------------------|---------------------|---------------------|---------------------------------|
| Seismic stations | 130                 | 95                  | 64                              |
| GPS stations     | 40                  | 27                  | 24                              |

### **Earthquake and Tsunami monitoring**

Earthquake: 20 earthquakes were monitored in the Indian region out of which 8 events were greater than magnitude (M) of 5.0.

Tsunami: No major seabed earthquake (M> 6) was generated with a potential to generate tsunami.

### Ocean Observation System

| Type of Platform                        | Target | Commissioned till April, 2016 | Data received during April, 2016 |
|---|--------|-------------------------------|----------------------------------|
| Argo Float                              | 200    | 280                           | 134                              |
| Drifters                                | 150    | 92                            | 11                               |
| Moored Buoys                            | 16     | 19                            | 18                               |
| Tide Gauges                             | 36     | 30                            | 25                               |
| High Frequency(HF) Radars               | 10     | 10                            | 9                                |
| Current Meter Array                     | 10     | 11                            | 5                                |
| Acoustic Doppler Current Profiler(ADCP) | 20     | 21                            | 18                               |
| Tsunami Buoys                           | 7      | 7                             | 6                                |
| Wave Rider Buoy                         | 16     | 10                            | 9                                |

\*The remaining floats/drifters have completed their life time and as such no data can be received from them.

In addition to above, as part of the 'Integrated Ocean Information System for the Indian Ocean Countries', ESSO-INCOIS successfully deployed a Wave Rider Buoy at Frigate Island, Seychelles on 16 March 2016. The buoy deployment was accomplished in coordination with RIMES and the Seychelles National Meteorological Services (SNMS).

On the request from ONGC, Kakinada unit, INCOIS is providing the information on surface currents (with Eddy information) in the Bay of Bengal to help them in carrying out their operations in the KG basin.

### **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)   | 30  |
| 5. | Real time global ocean analysis (daily)   | 6   |
| 6. | Coral Bleaching Alert System  | 10  |

### **Polar Science and Expedition**

Voyage team of 25 Indian expedition members returned from Antarctica to India after completing the scheduled tasks. Expandable CTD (XCTD) data collection including profiles of temperature and salinity down to 1000 m depth from the sea surface was carried out in the southwest Indian Ocean sector of Southern Ocean. A total of 179 stations were covered during the course of expedition which includes 60 stations from Cape Town to Bharati station, 53 stations from Bharati to Maitri and 66 stations from Maitri station to Cape Town. Meteorological data pertaining to dry air temperature, pressure, relative wind speed and wind direction and ship speed and direction for interpreting the stability of the atmospheric boundary layer were also collected at each station.

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

An area of 30,800 square km was surveyed with Gravity Coring at 4 stations, and grab sampling at 3 station.

### **Ocean Technology**

Coral reef exploration and scientific data collection activity was carried out using Polar Remotely Operated Vehicle (PROVe) at North Bay Island, Chidiyatapu Islands, Jolly Buoy Island, Red Skin Island and Grub Island in Andamans..

### **Swachh Bharat Abhiyan**

Under the Swachh Bharat Mission, Ministry of Earth Sciences and its institutes observed Swachhta Pakhwada during 14-29 April 2016 and removed scraps and cleaned up the premises.

### **Capacity Building and Outreach**

The 5th Session/meeting of Intergovernmental Oceanographic Commission's (IOC) Regional Committee for Central Indian Ocean (IOCINDIO) was hosted by the National Institute of Ocean Technology (NIOT), Chennai from 25<sup>th</sup> to 27<sup>th</sup> April 2016. Delegates of IOC/UNESCO from UK, France, Australia and Member States from Iran, Kuwait, Thailand and Bangladesh participated in this meeting. The work plan for IOCINDIO was finalized in the meeting.

First Meeting of Steering Committee of South Asia Flash Flood Guidance System was jointly convened with the World Meteorological Organization during April 26-28, 2016 at New Delhi.

A two-day brainstorming meeting on "Polar Sciences and Global Water Cycle" was conducted at ESSO-NCAOR during April 13-14, 2016. The Meeting was attended by scientists from different institutions and universities and key

scientific problems for the next 5/10 years were discussed which will be formulated into a Strategy Document and submitted to the Ministry of Earth Sciences.

The Training programme on "Integrated Coastal Zone Management (ICZM)" was held at Cochin during 18 -23 Apr, 2016 and about 50 trainees participated in the training programme.

The Earth Day was celebrated on 22 April 2016 in the Ministry. Various competitions were organized at schools to spread awareness about Mother Earth, supported by the Ministry. IITM Pune conducted various competitions under the theme 'Caring Mother Earth' for spreading awareness among school children about caring Mother Earth. More than 100 students from different schools participated in various competitions viz., Drawing/Poster Competition, Quiz Competition, Essay Writing Competition and 'Best Out of waste' Competition. The Event has been highlighted in the official Face Book page of IITM (<https://www.facebook.com/Indian-Institute-of-Tropical-Meteorology-IITM-Pune-230253470664289/> )

#### **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    | 0                         | 30(Repair of Azimuth thruster motor)                               | -             | -   |
| Sagar Manjusha | 28                        | -  | 2             | -   |
| Sagar Purvi    | 11                        | 13(Hull plate repair and cruise preparation)                       | 2             | 6   |
| Sagar Kanya    | 21                        | -  | 1             | 9   |
| Sagar Sampada  | 27                        | -  | 1             | 4   |

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

| Subject                      | Publications            |             |       | Ph.Ds                   |             |       |
|------------------------------|-------------------------|-------------|-------|-------------------------|-------------|-------|
|                              | April,2015– March, 2016 | April, 2016 | Total | April,2015– March, 2016 | April, 2016 | Total |
| Atmospheric Sciences         | 75                      | 17          |       | 8                       | -           | 8     |
| Ocean Science and Technology | 18                      | 3           |       | 3                       | -           | 3     |
| Polar Sciences               | 23                      | 1           |       | 2                       | -           | 2     |
| Geosciences and resources    | 30                      |             |       | 5                       | -           | 5     |
|                              | 146                     |             |       | 18                      | -           | 18    |