

Ministry of Earth Sciences (MoES)
Summary of Important Developments –May, 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 & 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
33	25

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:

Hon'ble Prime Minister of India dedicated the Doppler Weather Radar (DWR) to the nation at Cherrapunjee on 27.05.2016. This radar was built by ISRO for MoES activities.

Hon'ble Union Minister of Science & Technology and Earth Sciences Dr. Harsh Vardhan presided over a video conference on 24.5.2016 on achievement of two-years by Ministry of Science & Technology and MoES.

On 15th May 2016 IMD issued the forecast for the date of onset of monsoon over Kerala as 7th June with a model error of ± 4 days.

43rd Session of World Meteorological Organization/ Economic and Social Commission for Asia and the Pacific (WMO/ESCAP) Panel on tropical Cyclones was held during 2-5 May, 2016 at New Delhi. Participants from India Meteorological Department(IMD), National Centre for Medium Range Weather Forecasting(NCMRWF), Indian Institute of Tropical Meteorology(IITM), National Disaster Management Authority(NDMA) etc. attended the session.

Minimum Government, Maximum Governance:

Agromet Advisories were communicated to 116.7 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.

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 May, 2016	Data reporting
Automatic Weather Station (AWS)	675	680	411
Automatic Rain Gauge(ARG)	1350	1312	439
GPS Sonde	10	40	39
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	-	-	2450
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

Cyclonic Storm, 'ROANU' over the Bay of Bengal (17-22 May 2016): A low pressure area developed over southwest Bay of Bengal (BoB) off Sri Lanka coast in the evening of 14th May 2016. Moving northeastwards, north-northwestwards, it concentrated into a depression (D) and lay centered over southwest Bay of Bengal(BoB) off Tamil Nadu coast in the morning of 17th near latitude 11.00N and longitude 81.00E. It further moved nearly

northwards, intensified into a deep depression (DD) and lay centered over westcentral and adjoining southwest BoB near latitude 13.3°N and longitude 81.0 °E at 0830 hours IST of 18th. The system moved north-northeastwards skirting Tamil Nadu and Andhra Pradesh coast. It intensified into a cyclonic storm(CS) (ROANU) over westcentral BoB and lay centered near latitude 15.10N and longitude 81.40E with maximum sustained winds of 35 knots around the system centre in the early hours of 19th. The system continued to skirt along the east coast of India while moving northeastwards and intensified slightly with maximum sustained wind speed reaching 40 knots at 1130 hours IST of 19th and to 45 knots at 2330 hours IST 20th May. The system maintained its intensity of 45 knots and crossed Bangladesh coast near latitude 22.60N and longitude 91.60E, to the north of Chittagong around 1530 hours IST of 21st May as a CS. After landfall, the system started weakening due to land interactions. Continuing its east-northeastward journey, the CS ROANU gradually weakened into a DD over Mizoram at 2330 hours IST of 21st, into a depression over Myanmar and adjoining Manipur at 0530 hours IST of 22nd and into a well-marked low pressure area over Myanmar and adjoining Nagaland & Manipur at 0830 hours IST of 22nd May.

Heat wave/severe heat wave conditions prevailed over plains of northwest, west, central & peninsular India at a few days during second and third week and at one or two days during first week of May.

IMD's meteorological observatory at Phalodi (Rajasthan) recorded maximum temperature of 51.0 °C on 19th May 2016 which is the highest ever recorded temperature in India.

Rain/thunderstorm activity was observed over northeastern states at many days and over east & peninsular India at a few days of May. It was observed over northern plains, west and central India for one or two days in the month.

Thunder squall / hail occurred on 2nd May,2016 over Golaghat, Kamrup Rural, Lakhimpur districts of Assam, on 4th and 6th May over, Jorhat, Goalpara, Barpeta, Baga, Kamrup rural districts of Assam, on 11th May over Sonitpur, on 12th May over Golaghat, Saraideo, Jorhat, Sibsagar, and (Districts of Assam), on 16th May over Hojai, Hailakandi, on 17th May over Dhubri District which disrupted railway communication in Barak valley and over Guwahati Airport (Kamrup Metro) on 25th May.

Rainfall in May, 2016

Rainfall during the month of May, 2016 was excess in 13, normal in 12, and deficient/scanty in 11 of 36 meteorological sub- divisions. The rainfall for the country as a whole for the month of May, 2016 has been recorded as 66.9 mm (+7%) against the normal rainfall for the month as 66.9 mm.

Monsoon Weather Reports, Maps and Crop Yield Forecast

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 May 4, 11, 18 & 25.

Geoscience Research

Seismological Observational Network

Observation Type	Target for XII Plan	Commissioned so far	Data reporting during the month
Seismic stations	130	95	66
GPS stations	40	27	24

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: 2 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 both the events.

Ocean Observation System

Type of Platform	Target	Commissioned till May, 2016	Data received during May, 2016
Argo Floats	200	280	134
Drifters	150	92	11
Moored Buoys	16	19	18
Tide Gauges	36	30	24
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.

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)	25
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

Coral bleaching alerts were issued for Gulf Of Mannar, Andaman & Nicobar and Lakshadweep Islands as the thermal stress for the those areas persisted for more than 4 weeks and the SST hovered above 30 °C. The field reports received from NIOT confirmed coral bleaching in Andaman and Gulf of Mannar during end of April 2016.

High wave alerts/warning advisories were provided to Sri Lanka during 15 -19 May 2016, and also to the Deputy Director General Met, Maldives during 6 -20 May 2016.

Ocean state forecasts were provided during 14 -23 May 2016 to Indian Space Research Organization (ISRO), and the research vessel Sagar Manjusha was positioned in the Bay of Bengal before and during the launch day of reusable Launch Vehicle Technology Demonstration (RLV-TD) by ISRO.

Himalayan Cryosphere

Analysis of 500 ice core samples as well as studies over Batal glacier in Chandra Basin, Western Himalaya, revealed the influence of debris cover and its impact on the ablation processes. Almost 90 % of the ablation zone of the Batal glacier is covered by debris, 35% of which is thick debris (>10 cm). Our study has revealed high surface melting(-2.0 cm. w.e.d⁻¹) in the debris free glacier while low surface melting observed in thick debris covered ice (-0.6 cm.w.e.d⁻¹). Contrasting to the normal ablation pattern over glaciers, Batal has experienced inverse retreat rate of ablation along with increasing altitude. A high degree of negative correlation between ablation rate and debris thickness in Batal suggest a significant control of debris thickness over ablation rate .

Swath Bathymetric Survey of Exclusive Economic Zone

An area of 56,000 square km was surveyed with acquisition of bathymetric data.

Ocean Technology

Sea trial on the 0.8 m diameter straight blade horizontal axis current turbine was successfully carried out and demonstrated at a potential location near Port Blair in Andamans. The turbine generated electrical power as per expectation.

Capacity Building and Outreach

Two-day Annual Forecasters Meet-2016 with the theme 'Scope for Expansion of Public Weather Services' was organized at Pune on 23-24 May 2016.

IMD conducted short duration course for international trainees on "Agro-meteorology" during May 09-20, 2016 at Agromet Division, Pune.

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	31(Repair of Azimuth thruster motor)	-	-
Sagar Manjusha	20	11(fixing of transportable terminal and ante)	2	-
Sagar Purvi	0	31(Hull plate repair and cruise preparation)	2	6
Sagar Kanya	26	-	2	5
Sagar Sampada	27	-	1	4

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

Subject	Publications			Ph.Ds		
	April,2016	May, 2016	Total	April,2016	May, 2016	Total
Atmospheric Sciences	17	15	32	-	-	
Ocean Science and Technology	3	-	3	-	-	
Polar Sciences	1	12	13	-	-	
Geosciences and resources	-	-	-	-	-	
	21	27	48	-	-	