Indian Institute of Remote Sensing

सत्यमेव जयते

Government of India

Centre for Space Science and Technology Education in Asia Pacific

Remote Sensing and Satellite Based Meteorology in India

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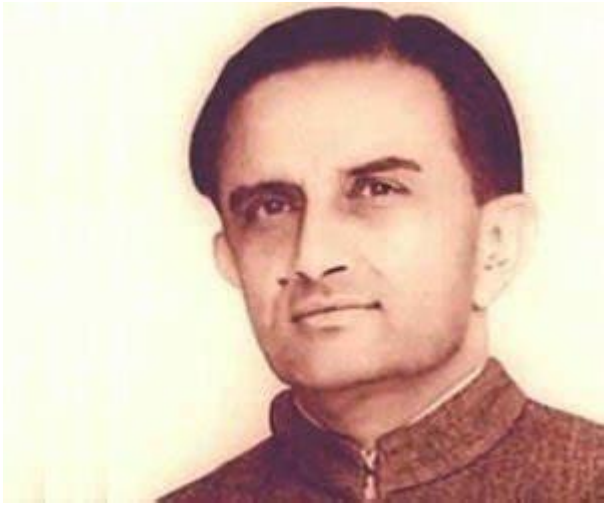
Contents

Introduction to Indian Space Research Organisation

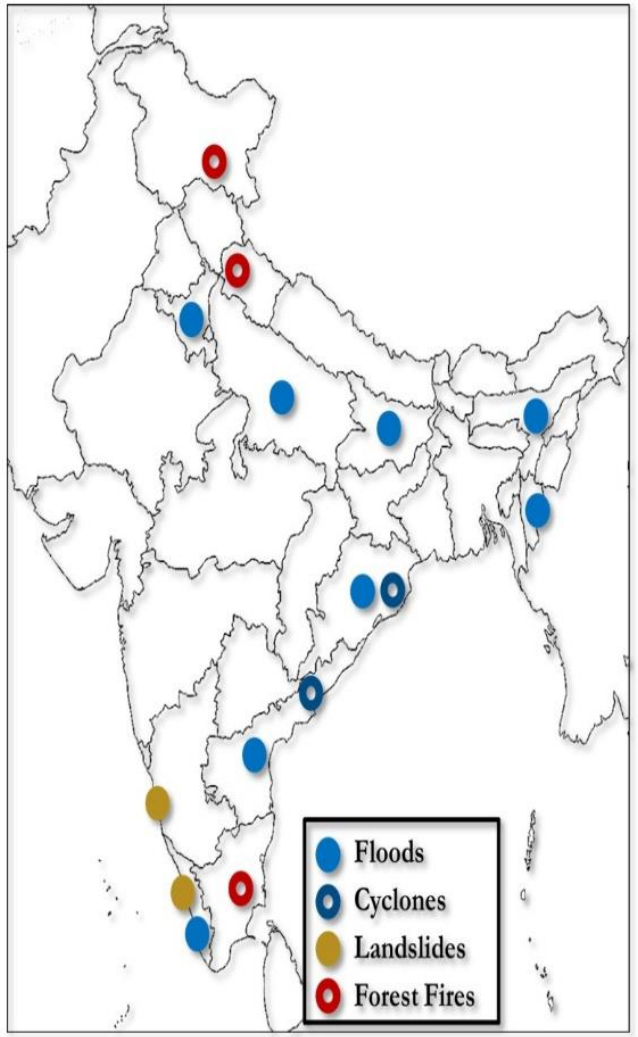
- Started as Indian National committee for Space Research (INCOSPAR) in 1962 under the leadership of the father of Indian space Program Dr. Vikram Sarabhai.
- 1st Centre Established at Thumba Equatorial Rocket Range.
- One of the 6th biggest space agencies in the world today.
- Works in areas of broadcast, Communication, weather, Forecast, disaster management, GIS, Cartography, Navigation, Outreach and Telemedicine.
- 23 Decentralized Centers in India.



Dr. Vikram Sarabhai

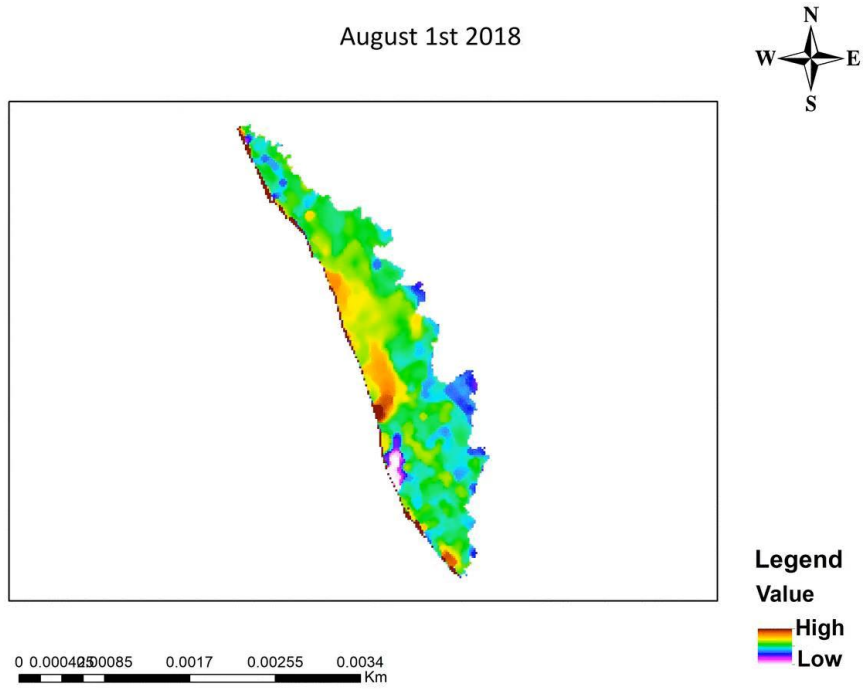
Disaster Management

- Satellite Images provide a synoptic birds eye view of the Earth's surface along with major calamities like forest fires, floods, landslides, cyclones.
- Disaster Management Support program (DMS) using space based inputs.
- Portals like Bhuvan, National Database for Emergency Management and MOSDAC.



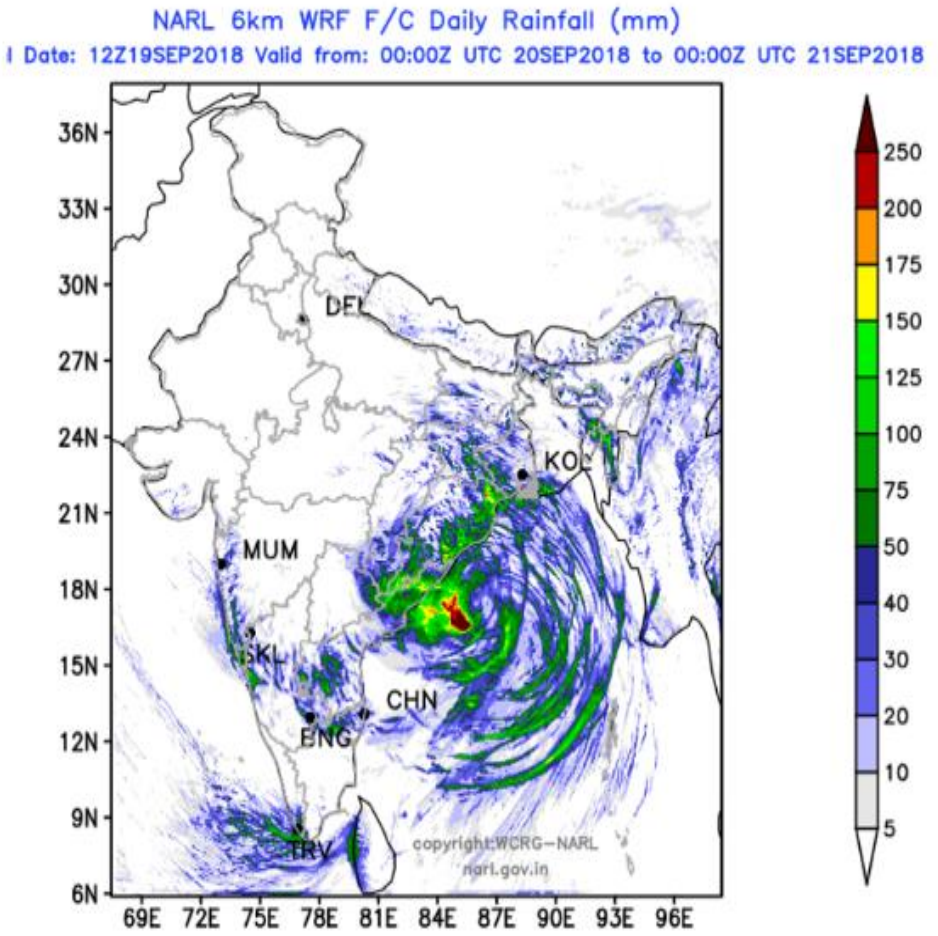
Meteorology

- Indian Meteorological Department primary user of Meteorological satellites of INSAT satellite series.
- Data of Meteorological aspect processed by INSAT Meteorological Data Processing System (IMDPS) in New Delhi.
- Other Meteorological satellites include KALPANA-1 with a VHRR instrument providing daily data every 30min.
- Products include images, water vapour, atmospheric motion vectors, sea surface temperature, long wave radiation, tropospheric humidity, NDVI, AOD.



- monitoring of cyclone intensity, its location, and various other weather systems such as fog, thunderstorms, Western disturbances and Norwesters, etc.,
- 40 Digital Meteorological Data Dissemination (DMDD) stations set up by IMD.
- 1158 AWS of IMD and 1000 AWS of ISRO, 969 Automatic rain gauge stations.
- 353 cyclone warning centres.
- Disaster Warning and Dissemination System (DWDS) collective data accumulation from ISRO, IMD and News channels.
- Imp Links: www.imd.gov.in

  : https://live.mosdac.gov.in/



Accumulated Daily Rain Forecast for 20th September 2018

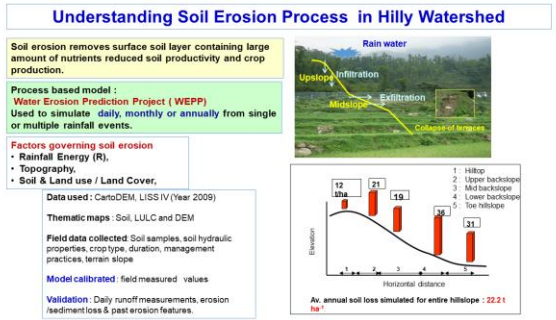
Earth Observation

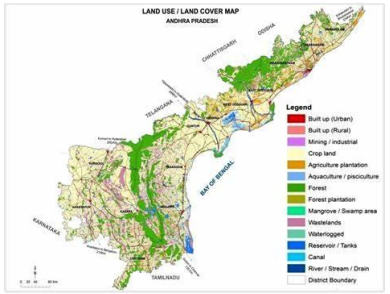
- Applications include Agricultural Crops Inventory, Water Resources Information System, Ground Water Prospects, Forest Working Plans, Biodiversity and Coral Mapping, Potential Fishing Zones, Ocean State Forecasts, Rural Development, Urban Development, Inventory & Monitoring of Glacial Lakes / Water Bodies, Location based Services using NavIC constellation, Disaster Management Support Programme, Cyclone and Floods Mapping & Monitoring, Landslide Mapping & Monitoring, Agricultural Drought, Forest Fire, Earthquakes, Extreme Weather Monitoring and experimental Forecasts and so on.
- EO data: https://bhuvan.nrsc.gov.in/bhuvan_links.php

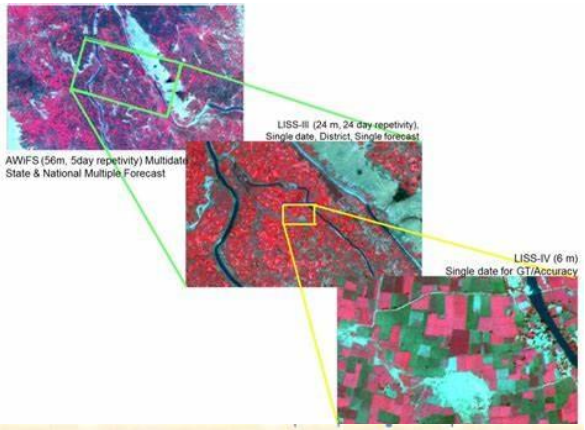
  :https://vedas.sac.gov.in/

Sr. No.	Satellite	Date of Launch	Launch Vehicle	Status
1	IRS 1A	17 March 1988	Vostok, USSR	Mission Completed
2	IRS 1B	29 August 1991	Vostok, USSR	Mission Completed
3	IRS P1 (also IE)	20 September 1993	PSLV-D1	Crashed, due to launch failure of PSLV
4	IRS P2	15 October 1994	PSLV-D2	Mission Completed
5	IRS 1C	28 December 1995	Molniya, Russia	Mission Completed
6	IRS P3	21 March 1996	PSLV-D3	Mission Completed
7	IRS 1D	29 September 1997	PSLV-C1	Mission Completed
8	IRS P4 (Oceansat-1)	27 May 1999	PSLV-C2	Mission Completed
9	Technology Experiment Satellite (TES)	22 October 2001	PSLV-C3	In Service
10	IRS P6 (Resourcesat-1)	17 October 2003	PSLV-C5	In Service
11	IRS P5 (Cartosat 1)	5 May 2005	PSLV-C6	In Service
12	Cartosat 2 (IRS P7)	10 January 2007	PSLV-C7	In Service
13	Cartosat 2A (IRS P?)	28 April 2008	PSLV-C9	In Service
14	IMS 1 (IRS P?)	28 April 2008	PSLV-C9	In Service
15	Oceansat-2	23 September 2009	PSLV-C14	In Service
16	Cartosat-2B	12 July 2010	PSLV-C15	In Service
17	Resourcesat-2	20 April 2011	PSLV-C16	In Service

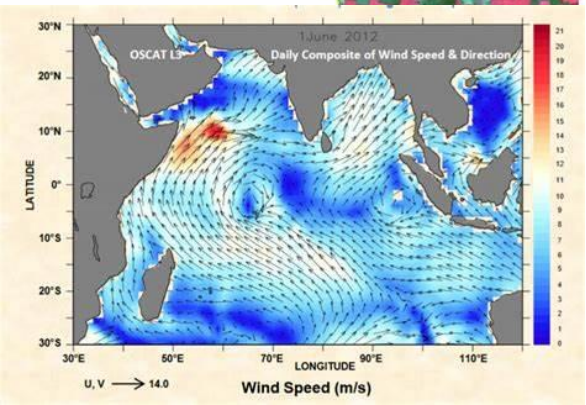
Applications of Satellite Data in India

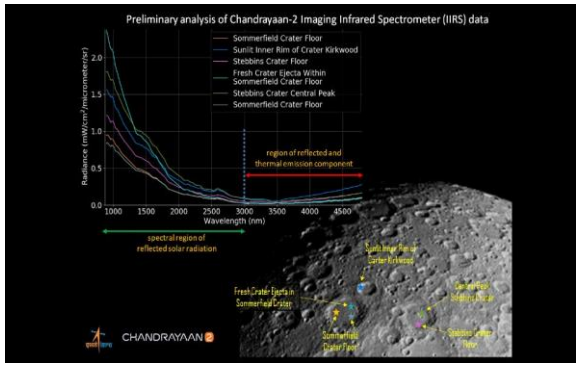


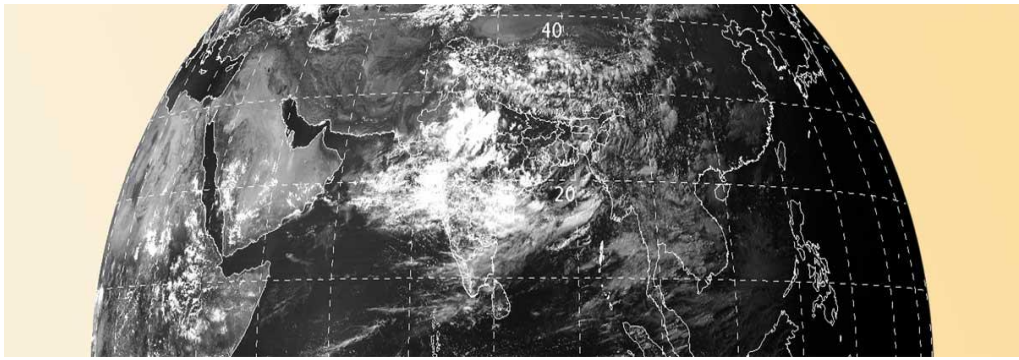




Agriculture and Soils	Renewable energy
Forest and environment	Geology
Governance	Land Resources
Ocean Sciences	Rural Development
Urban Development	Water Resources
Weather and Climate	National Meet Outcomes







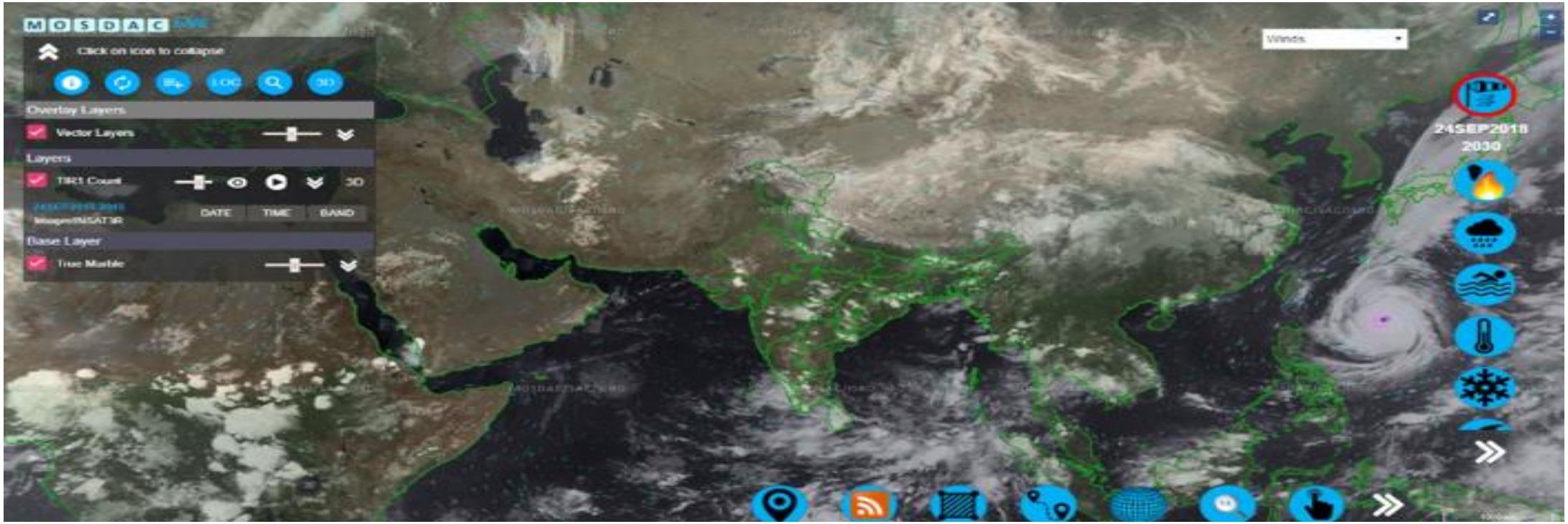
Introduction of FENGYUN Meteorological Satellite data reception in India

- International cooperation is a strategic area for a space programme.
- Memoranda of Understanding (MoU) signed with Afghanistan, Algeria, Armenia, Argentina, Australia, Bangladesh, Brazil, Brunei Darussalam, Bulgaria, Canada, Chile, China, Egypt, France, Germany, Hungary, Indonesia, Israel, Italy, Japan, Kazakhstan, Kuwait, Mauritius, Mexico, Mongolia, Morocco, Myanmar, Norway, Portugal, Peru, Republic of Korea, Russia, Sao-Tome & Principe, Saudi Arabia, Singapore, South Africa, Spain, Sultanate of Oman, Sweden, Syria, Tajikistan, Thailand, The Netherlands, Ukraine, United Arab Emirates, United Kingdom, United States of America, Uzbekistan, Venezuela and Vietnam.

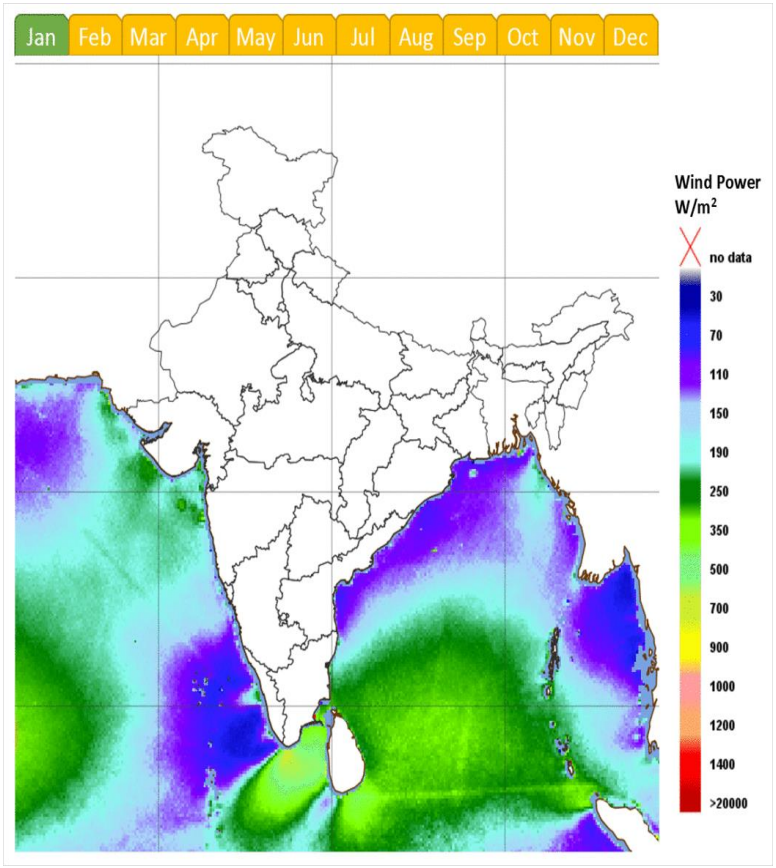
- The National Satellite Metrological Center and China Meteorological Administration (CMA) have launched dedicated meteorological and oceanographic satellites viz. FY-2 series and FY-4 series of Geostationary Satellites and FY-1, FY-3 series and TanSat series LEO satellites for earth observation.
- These Meteorological satellites provide important data products with application in areas of atmosphere, land, ocean and radiation. With a constellation of 25 satellites producing 122 data products with 5827TB of data and 81,203 users.
- At the Geoscience and Geohazards division of Indian Institute of Remote Sensing, ISRO, we work in research areas of Risk and vulnerability assessment, Flash flood hazard mapping and modelling, Snow melt runoff modelling, Mapping of glaciers, glacial lakes and modelling of glacial lake outburst flood, Forest fire and degradation analysis, Ecosystem vulnerability to climate change and Extreme precipitation modelling.
- Integrating FENGYUN Satellite data products into these domains can help us in better decision making and providing real time analysis for Disaster detection, management, response and mitigation scenarios in future.

Use of SWAP and SMART Software

- MOSDAC provides information about meteorology, oceanography and tropical cyclones. (https://www.mosdac.gov.in/)
- Scatterometer satellite data is given through ftp://ftp.mosdac.gov.in/).



- In terms of Earth Observation applications, we use Earth observation archival system called as VEDAS (Visualization of Earth Data and Archival System) division of ISRO through (https://vedas.sac.gov.in/vedas/). It uses Satellites like RESOURCESAT, TERRA, AQUA, IRS, Oceansat and Cartosat series.



Further Demands regarding FENGYUN satellite products and Applications

- We would like to know how FENGYUN satellite products can help in fulfilling the United Nations Sustainable Development Goals and help us in areas of Biodiversity and ecosystem sustainability, Disaster resilience, Energy and mineral resources management, Food security and precision agriculture, Public health surveillance, Sustainable urban development, Infrastructure and transportation management and finally Water resources management.
- Hyperspectral satellite development in China.
- Application of TANSAT satellite for air quality mapping in India.
- Ash cloud monitoring.


THANK YOU