



National Information system for Climate and Environment Studies

NICES at a Glance

National Information system for Climate and Environment Studies (**NICES**) programme was initiated on during September, 2012 at NRSC to generate a long-term climate database on environmental parameters with the consent of various government departments, ministries and scientific institutions along with the centres of Indian Space Research Organisation (ISRO) involved in environment and climate related studies. This activity envisages the realization of a national level climate database, particularly derived from Indian and other Earth Observation (EO) satellites of polar and geostationary orbits to assess climate change impact on Indian environment and formulate alternate mitigation strategies.

The programme has been functioning under the overall guidance of the NICES Programme Management Council (PMC) comprising members from inter- and intra-departmental institutions under the Chairmanship of Director, NRSC. The programmatic activities of NICES are reviewed by experts from ISRO/DOS Centres periodically. Over these years, NICES has developed adequate infrastructure to build a climate database with geophysical variables pertaining to terrestrial, ocean and atmosphere. The products are disseminated through the NICES portal hosted on 'Bhuvan' geo-portal of ISRO. These data are being used by several government organisations for their planning activity and academia for innovative use in environment and climate study. The climate and environmental studies are planned to strengthen and interlink scientific network in ground data collection and to augment with additional ground based instruments. The program also envisages an active collaboration with research institutes and government departments for data sharing and ground support.

NICES Objectives

- To build a long-term database on climate variables.
- Establish and develop linkages with appropriate observational networks for calibration & validation.
- Acquisition and processing of international missions data for climate parameters in addition to Indian EO satellite data to generate long-term climate data records.
- To establish necessary infrastructure including hardware and software.
- Geophysical parameter retrieval and generation of methodologies for Essential Climate Variables (ECVs) from Indian EO and other international missions.
- Generation of spatial & temporal blended products.
- Develop a science plan for climate change impact assessment, adaptation and mitigation studies with participating organizations
- Develop an outreach and interaction mechanism for effective dissemination and utilization of NICES information base.
- Capacity Building.

Terrestrial Products

Sl. No.	Geophysical Products	Satellite/Sensor	Coverage	Availability	Resolution		File Size
					Spatial	Temporal	
ECV							
1.1	Land Use Land Cover (MM5-Compatible)	Resourcesat -2 / AWiFS	Global	2004-2005 to 2018-2019	30"/2'5'	Yearly	~10 – 30 MB
1.2	Land Use Land Cover (WRF Compatible)	Resourcesat -2 / AWiFS	Global	2004-2005 to 2018-2019	30 "2'5'	Yearly	~ 2 MB
2	Mean Organic Soil Carbon density	Resourcesat -2 / AWiFS	India	2014	5 km	Once	~ 40 - 200 KB
3	Surface Soil Moisture	AQUA AMSR-E & GCOM-W1 / AMSR2	India	Jul 2002- Jun 2022	0.25°	2 days	~ 50 KB
4	Snow Cover Fraction	Resourcesat -2 / AWiFS	Himalayans	Mar 2014 – Apr 2022	3'x3'	Fortnight	~ 20 KB
5	Average Annual Forest Fire Density	AQUA and TERRA/MODIS	India	Jan 2003 – 2016	5 km	Year Average	~150 - 250KB
6	Surface water bodies fraction	Resourcesat-2,2A/ AWiFS	India	Jan 2014 - Mar 2022	3'x3'	Fortnightly	~ 600 KB
Geophysical Products							
1	Albedo	Oceansat - 2 / OCM-II	India	Jan 2013 - Dec 2021	1 Km	Fortnightly	~ 4-6 MB
2 Normalized Difference Vegetation Index (NDVI)							
2.1	NDVI	Oceansat - 2 / OCM-II	Global	Jun 2013 - Sep 2019	8 Km	Monthly	~ 2-3 MB
2.2	NDVI	Oceansat - 2 / OCM-II	India	Jan 2011 - Dec 2021	1 Km	Fortnightly	~ 4-6 MB
2.3	Filtered NDVI	Oceansat - 2 / OCM-II	India	Jan 2012 - Jun 2021	1 Km	Fortnightly	~ 4-6 MB
3	Vegetation Fraction	Oceansat - 2 / OCM-II	India	Jan 2011 – Dec 2021	1 km	Fortnightly	~ 4-6 MB
4 Soil							
4.1	Mean Inorganic Soil Carbon density	Resourcesat -2 / AWiFS	India	2014	5 km	Once	~ 40 - 200 KB
4.2	Fraction Soil Depth	Resourcesat -2 / AWiFS	India	2000	5 km	Once	~ 40 - 200 KB
4.3	Fraction Soil Textural Class	Resourcesat -2 / AWiFS	India	2014	5 km	Once	~ 40 - 200 KB
5 Land Degradation (3 Layers)							
5.1	Fraction Water Erosion	Resourcesat -2 / LISS-III	India	2005-2006	5 km	10 years	~ 0.5 MB
5.2	Fraction Wind Erosion	Resourcesat -2 / LISS-III	India	2005-2006	5 km	10 years	~ 0.5 MB
5.3	Fraction Salt-affected	Resourcesat -2 / LISS-III	India	2005-2006	5 km	10 years	~ 0.5 MB
6 Forest fire							
6.1	Standard Deviation of Average Annual Forest Fire Density	AQUA and TERRA/MODIS	India	Jan 2003 – 2016	5 km	Year Average	~150 - 250KB
6.2	Length of Fire Period	AQUA and TERRA/MODIS	India	Jan 2003 – 2016	5 km	Year Average	~150 - 250KB
7	Forest Cover Fraction	SOI/Landsat-MMS&TM/ Resourcesat -2 / AWiFS	India	1930, 1975, 2013	5 km	Yearly	~450 - 550KB
8	Forest Types	Resourcesat -2 / AWiFS	India	2013	5 Km	Yearly	~30 - 300KB
9 Net Sown Area							
9.1	Fractional Net Sown Area	Resourcesat -2/ AWiFS	India	2005 – 2016	5 km	Yearly	~ 100 KB
9.2	Fractional Kharif Sown Area	Resourcesat -2/ AWiFS	India	2005 – 2016	5 km	Yearly	~ 20 KB
9.3	Fractional Rabi Sown Area	Resourcesat -2/ AWiFS	India	2005 – 2016	5 km	Yearly	~ 150 KB
9.4	Fractional Fallow Area	Resourcesat -2/ AWiFS	India	2005 – 2016	5 km	Yearly	~ 150 KB

Terrestrial Products

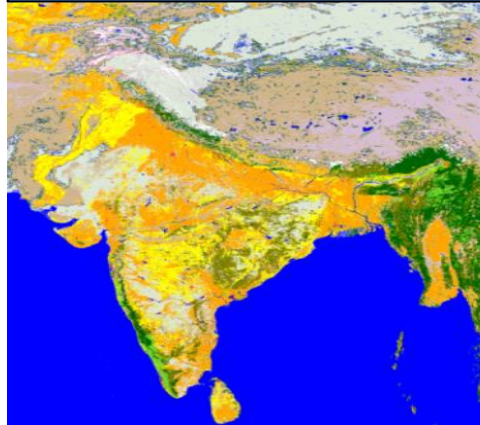
Sl. No.	Geophysical Products	Satellite/Sensor	Coverage	Availability	Resolution		File Size
					Spatial	Temporal	
10	Snow Melt and Freeze	Oceansat - 2 / OSCAT	Indian Himalayas	Jan 2000 - Dec 2018	2.225 km	Daily	~ 100 KB
11	Himalayan Glacial Lakes & Water Bodies	Resourcesat -2 / AWiFS	Himalayan region of Indian river basins	Jun 2011 - Oct 2016	1:250,000 scale	Monthly	~ 150 KB
12	Snow Melt and Freeze	Oceansat - 2 / OSCAT	Antarctica	Jan 2001 - Feb 2021	2.225 km	Daily	~ 100 KB
13	Snow Albedo	Resourcesat -2/ AWiFS	India	Jan 2015 - Jun 2022	250 m	-	~ 3-5 MB
14	Distributed Hydrology Model (VIC)						
14.1	Soil Moisture	Model Derived	India	Jun 2013 – Jan 2022 Jan 1976 - Dec 2015	9' x 9'	Daily	~150 - 250 KB
14.2	Evapo-transpiration	Model Derived	India	Jun 2013 - Jan 2022 Jan 1976 - Dec 2015	9' x 9'	Daily	~150 - 250 KB
14.3	Surface Runoff	Model Derived	India	Jun 2013 - Jan 2022 Jan 1976 - Dec 2015	9' x 9'	Daily	~ 150 - 250 KB
15	Net Ecosystem Productivity	Model Derived	India	1981- 2018	2' x 2'	Monthly	~ 300 MB
16	Net Primary Productivity	Model Derived	India	1981- 2018	2' x 2'	Monthly	~ 300 MB

Few Terrestrial Products

Monthly averaged Soil moisture (m³/m³) over India during 30 Mar 2022



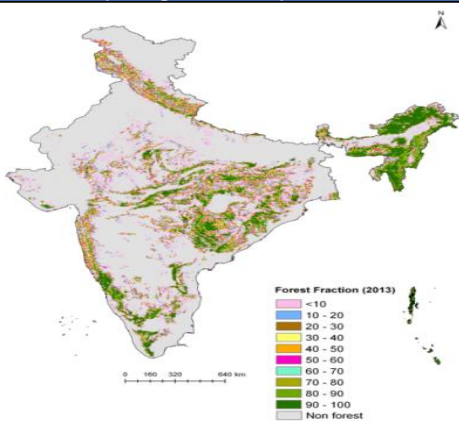
LU/LC (AWiFS)



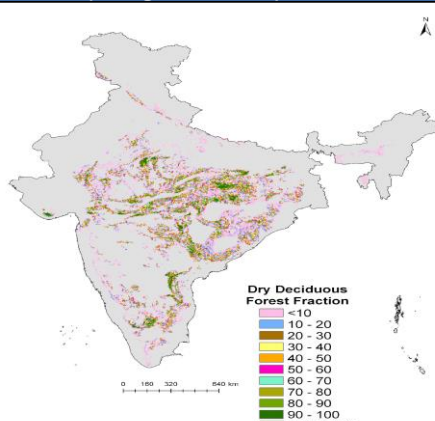
Snow Cover (%) 01-15 Apr 2022



Fractional forest cover (5km grid- AWiFS) - 2013



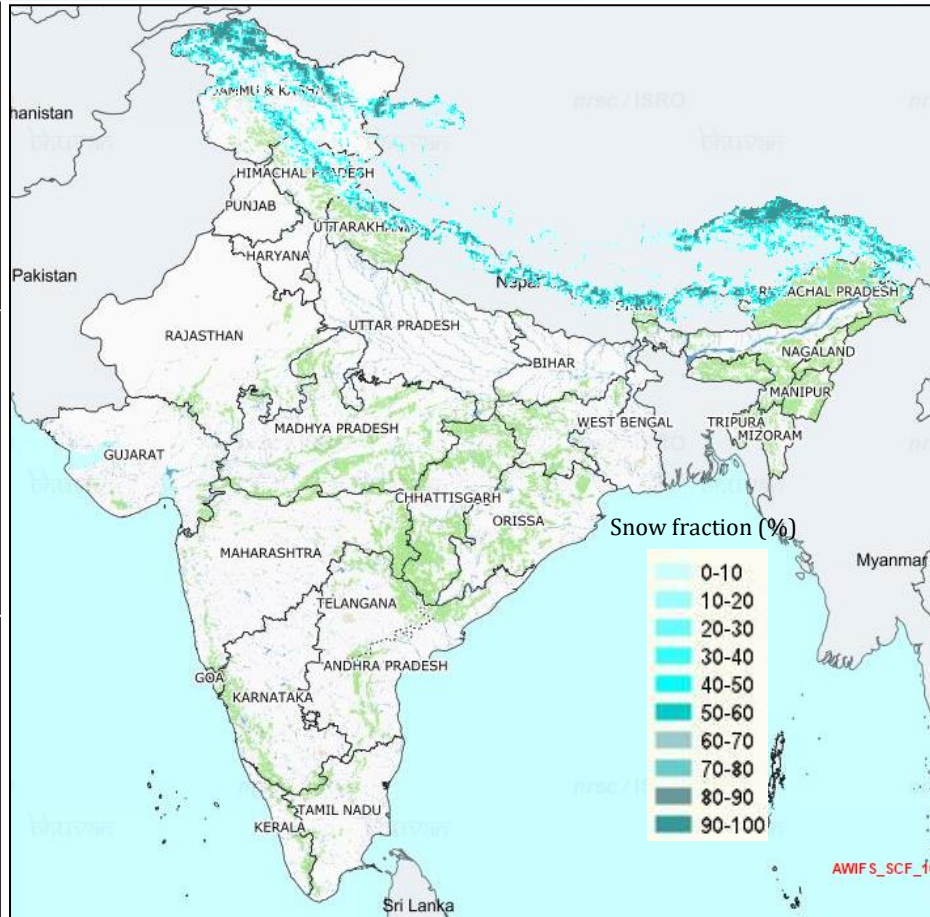
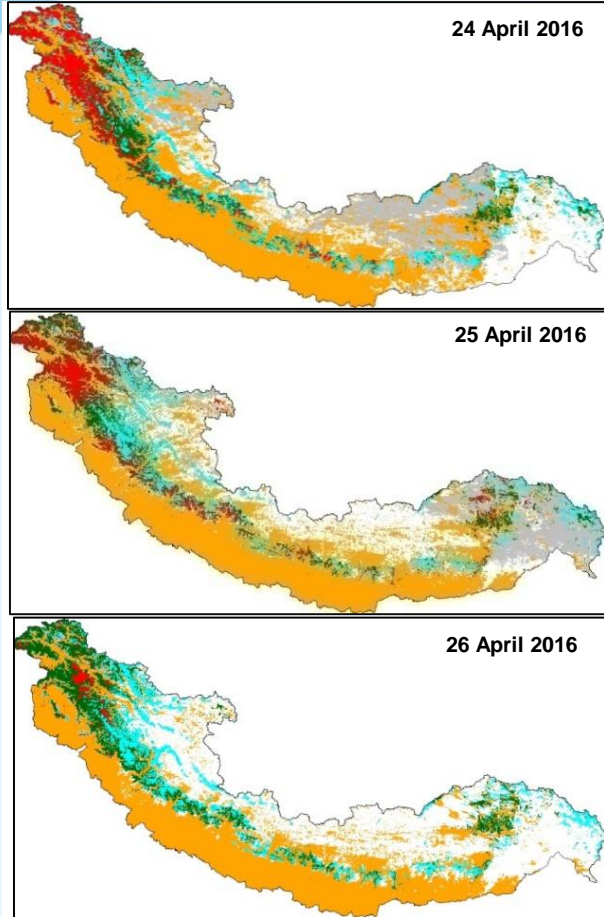
Forest type (5km grid- AWiFS) - 2013



Water Bodies Fraction (AWiFS) during 16-31 Mar 2022

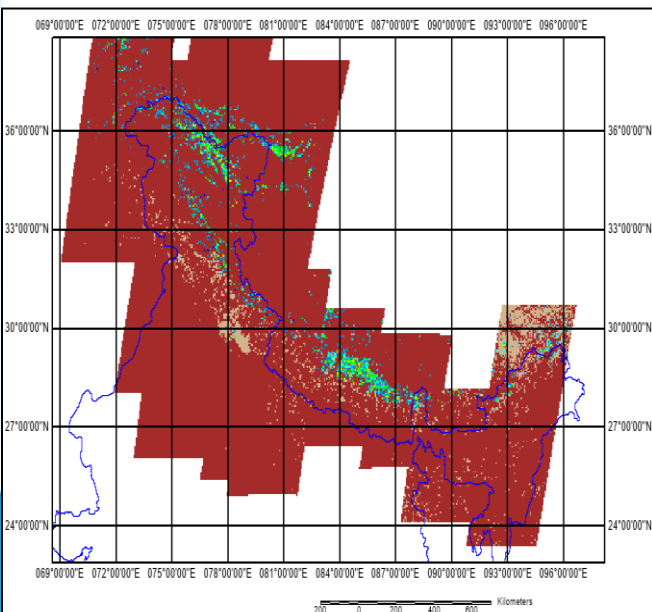


Few Terrestrial Products

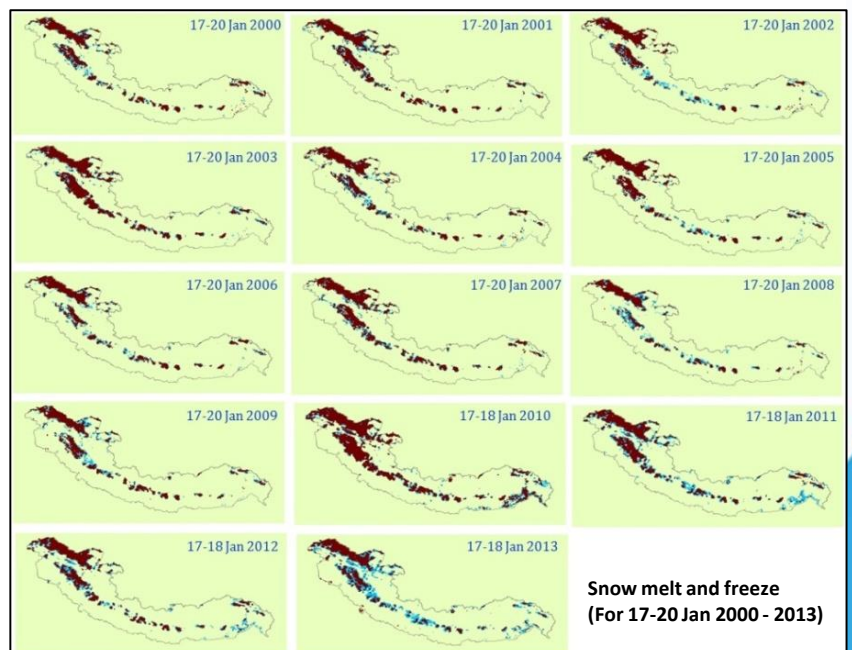


- Snow on Day
- Last 3 day Snow
- No data
- Historic snow
- Snow free area
- Cloud

Snow Cover Fraction (%) 3'X 3' Grid during 16-31 Oct 2016



Snow Albedo mosaic for Cycle1 of Oct 14



Snow melt and freeze (For 17-20 Jan 2000 - 2013)

Ocean Products

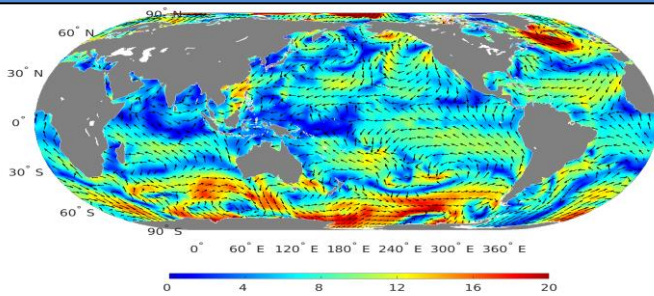
Sl. No.	Geophysical Products	Satellite/Sensor	Coverage	Availability	Resolution		Each File Size
					Spatial	Temporal	
ECV							
1. Ocean Surface Winds							
1.1	Ocean Surface Winds	OSCAT/ScatSAT-1	Global Ocean	Jan 2010 - Oct 2020	0.5°	Daily	~ 2 MB
1.2	Ocean Surface Winds	OSCAT/ScatSAT-1	North Indian Ocean	Jan 2010 - Oct 2020	0.25°	Daily	~ 2 MB
2. Wind Stress							
2.1	Wind Stress	OSCAT/ScatSAT-1	Global Ocean	Jan 2010 - Oct 2020	0.5°	Daily	~ 2 MB
2.2	Wind Stress	OSCAT/ScatSAT-1	North Indian Ocean	Jan 2010 - Oct 2020	0.25°	Daily	~ 2 MB
3	Ocean Surface Currents	SARAL ALTIKA & OSCAT/ScatSAT-1	Indian Ocean	Mar 2013 – Sep 2020	0.25°	Daily	~ 1 MB
4. Ocean Chlorophyll							
4.1	Chlorophyll Concentration (using OC2 algorithm)	Oceansat - 2/ OCM II	North Indian Ocean	2010 – Mar 2020	1Km	2 Days, 8 Days & Monthly	~ 30 MB
4.2	Chlorophyll Concentration (using OC4 algorithm)	Oceansat -2/ OCM II	North Indian Ocean	2010 - Mar 2020	1 Km	2 Days, 8 Days & Monthly	~ 15 MB
4.3	Chlorophyll Concentration (using OC2 algorithm)	Oceansat - 2/ OCM II	Global	2011- Dec 2020	4 Km	8Days & Monthly	~ 30 MB
4.4	Chlorophyll Concentration (using OC4 algorithm)	Oceansat - 2/ OCM II	Global	2011 - Dec 2020	4 Km	8Days & Monthly	~ 15 MB
Geophysical Products							
1 Wind curl							
1.1	Wind Curl	OSCAT/ScatSAT-1	Global Ocean	Jan 2010 - Oct 2020	0.5°	Daily	~ 2 MB
1.2	Wind Curl	OSCAT/ScatSAT-1	North Indian Ocean	Jan 2010 - Oct 2020	0.25°	Daily	~ 2 MB
2	Sea Level Pressure	Oceansat - 2/OSCAT & ScatSAT-1	Global	Jan 2010 - Feb 2021	0.5°	Daily	~ 1 MB
3	Ekman Currents	OSCAT/ScatSAT-1	Indian Ocean	Mar 2013 – Sep 2020	0.25°	Daily	~ 2 MB
4	Sea Surface Height Anomaly	SARAL ALTIKA	Indian Ocean	Mar 2013 – Sep 2020	0.25°	Daily	~ 1 MB
5	Geostrophic Currents	SARAL ALTIKA	Indian Ocean	Mar 2013 – Sep 2020	0.25°	Daily	~ 2 MB
6	Eddy Kinetic energy (EKE)	Altimeter SSHA (AVISO)	Indian Ocean	Jan 1993 – May 2022	0.25°	Daily Monthly	~ 200 KB
7	Monthly Mean Sea Level Anomaly (MMSLA)	Altimeter SSHA (AVISO)	Indian Ocean	Jan1993 - Dec 2011	1°	Monthly	~ 200 KB
8 Diffuse Attenuation Coefficient							
8.1	Diffuse Attenuation Coefficient at 490 nm (KD ₄₉₀)	Oceansat - 2/ OCM II	North Indian Ocean	2010 - Mar 2020	1 Km	2 Days, 8 Days and Monthly	~ 30 MB
8.2	Diffuse Attenuation Coefficient at 490 nm (KD ₄₉₀)	Oceansat - 2/ OCM II	Global	2011 - Dec 2020	4 Km	8Days & Monthly	~ 30 MB
9	Total Alkalinity (TA)	Aquarius & MODIS	Global	1992 – 2018	0.25°	Weekly	~ 4.0 MB
10	Dissolved Inorganic Carbon (DIC)	Aquarius & MODIS	Global	2014 – May 2018	0.25°	Weekly	~ 4.0 MB

Ocean Products

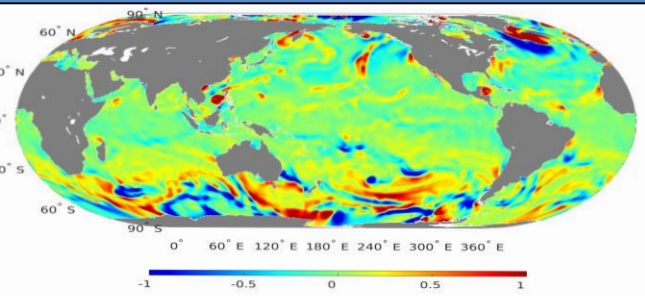
Sl. No.	Geophysical Products	Satellite/Sensor	Coverage	Availability	Resolution		Each File Size
					Spatial	Temporal	
11 Co-Tidal Map							
11.1	K101 Co-Tidal Map	Model	68°E to 5.5°N to 24°N 89.5°E	One map	2'	_	~ 1 MB
11.2	M2S2 Co-Tidal Map	Model	5.5°N to 24°N 68°E to 89.5°E	One map	2'	_	~ 1 MB
12	Ocean Heat Content (OHC) and Ocean Mean Temperature (OMT) at different Depths	TMI/AMSR-2 SST & Altimeter SSHA	Indian Ocean	Jan 1998 – Jun 2022	0.25°	Daily	~ 0.5 MB
13	Tropical Cyclone Heat Potential	TMI/AMSR-2 SST & Altimeter SSHA	Indian Ocean	Jan 1998 - Jun 2022	0.25°	Daily	~ 0.5 MB
14	Ocean Heat Content of 700m Layer	TMI/AMSR-2 SST & Altimeter SSHA	Indian Ocean	Jan 2002 - Jun 2022	0.25°	Daily	~ 0.5-1MB
15	Tropical Cyclone Heat Potential Forecast	Model Derived	30°S to 30°N 30°E to 120°E	Jul 2013 – Jun 2022	0.5°	Daily	~ 0.5 MB
16	Depth of 26 Degree Isotherm	Model Derived	30°S to 30°N 30°E to 120°E	Jul 2013 – Apr 2019	0.5°	Daily	~ 0.5 MB

Few Ocean Products

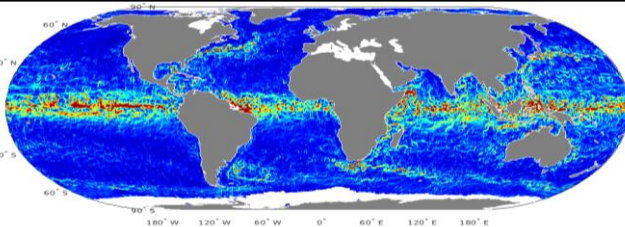
SCATSAT wind stress (N/m²) 2-days composite
26 Oct 2020



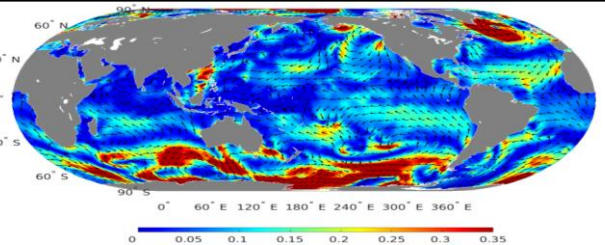
SCATSAT wind curl (10⁻⁶N/m³) 2-days composite
26 Oct 2020



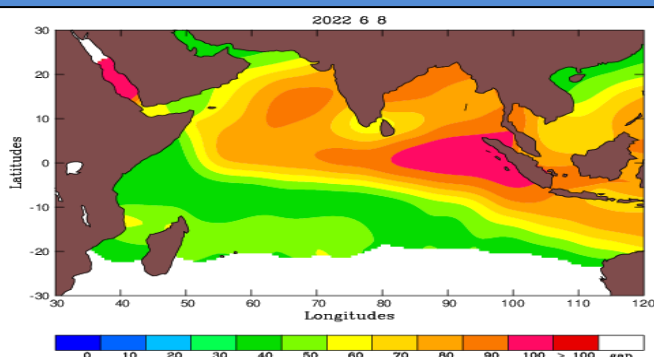
Ocean Surface Current (cm/s) estimated using SCATSAT-1 wind & SARAL AltiKa SSHA data 23 Sep 2020



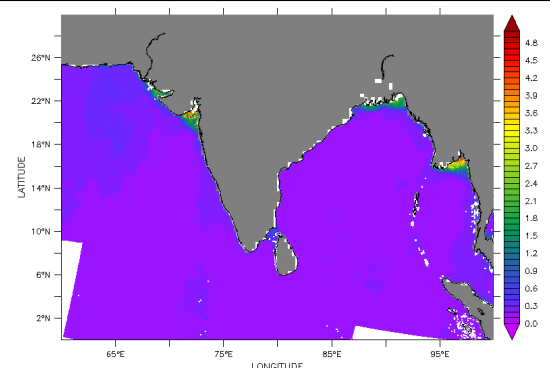
SCATSAT wind velocity (m/s) 2-days composite
26 Oct 2020



Daily Tropical Cyclone Heat Potential (KJ/cm²) 08 Jun 2022



OCM2 Chlorophyll-a monthly concentration (mg/m³) Mar 2020



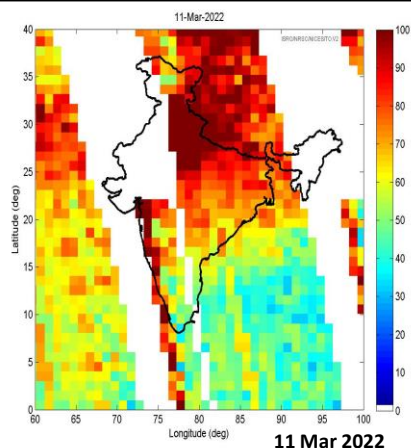
Atmospheric Products

S. No.	Geo Physical Dataset	Satellite/Sensor	Coverage	Availability	Resolution		File Size
					Spatial	Temporal	
ECV							
1	Cloud Fraction	KALPANA/VHRR & INSAT 3D/Imager	-10° to 45.5°N 44.5° to 105.5°E	Jan 2015 to Jan 2021	0.25°x0.2°	Half Hourly	~ 2-4 MB
2	Cloud Top Temperature	INSAT-3D	-10° to 45.5°N 44.5° to 105.5°E	Jan 2018 to Jun 2022	0.5°x0.5°	Half Hourly	~ 2-4 MB
3	Lightning	Ground Network	Indian region	Sep 2019 to Till date	0.1° x 0.1°	Daily	~ 25 KB

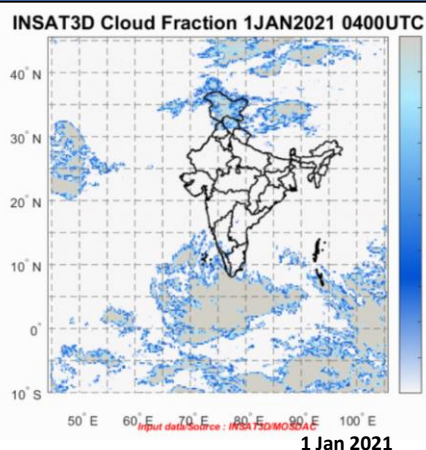
Geophysical Products

1	Derived Tropospheric Ozone	OMI & MLS / AURA	Indian region	Jan 2010 to Mar 2022	1° x 1°	Daily	~ 500 KB
2	Planetary Boundary Layer Height	SNPP / CrIS	05°N to 40°N 50°E to 110°E	Sep., 2014 to Aug 2021	0.25° x 0.25°	Daily 7 Days Monthly	~ 200-300 KB

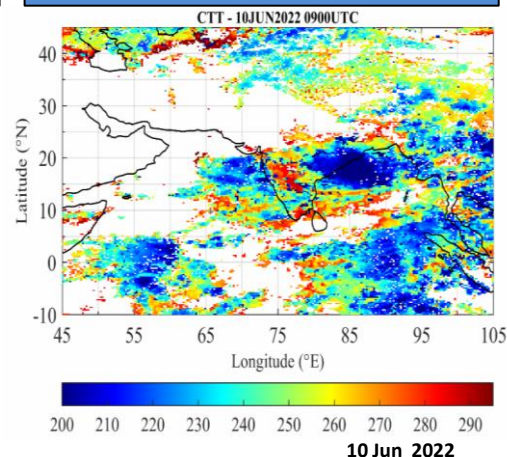
Tropospheric columnar Ozone



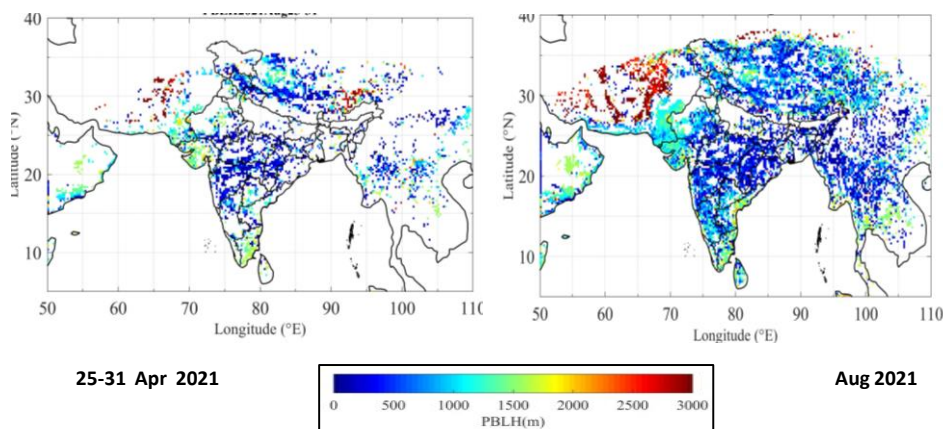
Cloud Fraction



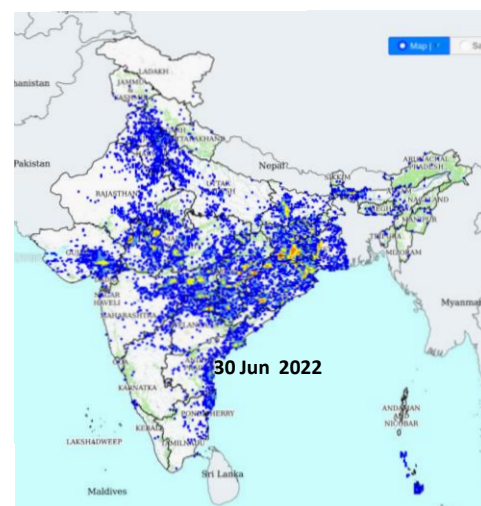
Cloud Top Temperature



Planetary Boundary Layer Height using SNPP-CrIS Profiles



Lightning





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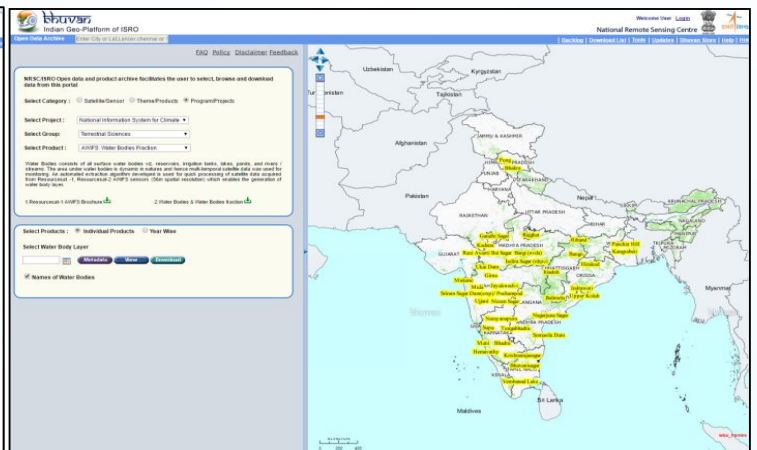
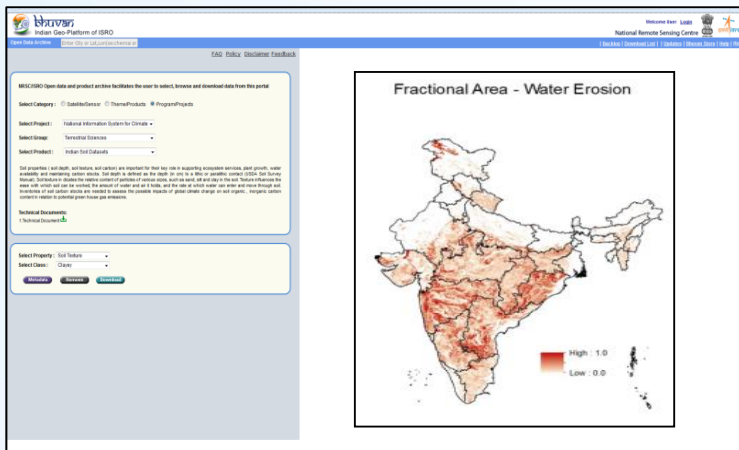
Ocean & Atmospheric Instruments



NICES Home Page

Data base Web Portal:

- ❖ NICES data products are available at <http://www.nrsc.gov.in/nices>
- ❖ The portal was operational since October 2013
- ❖ More than 2,40,000 (Mar 2022) instances of data downloads recorded so far
- ❖ For more details visit web pages showing NICES products



For Further Details, Please Contact:

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