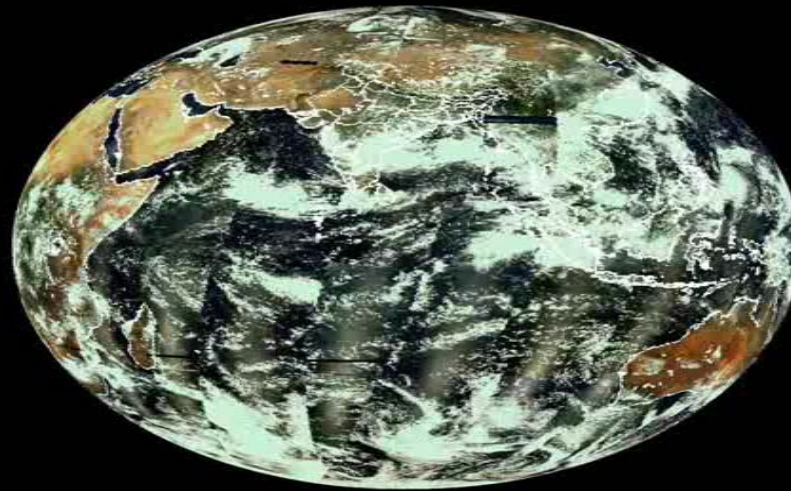


Oceansat-2 Mission



Indian Space Research Organisation

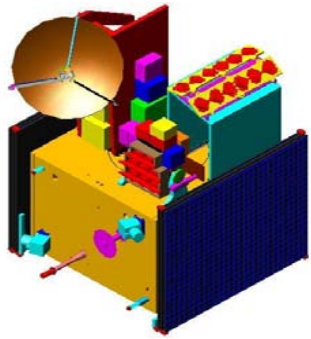


47th Session of STSC-UNCOPUOS

Vienna, February 08-19, 2010



Oceansat-2 Mission



OCEANSAT-2 is a global mission and is configured to cover global oceans, and provide continuity of ocean colour data with global wind vector and characterization of lower atmosphere and ionosphere.

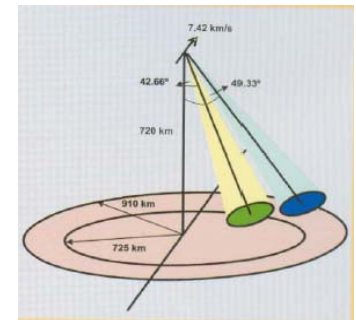
INSTRUMENTS

Modified Ocean Colour Monitor (OCM-2)

Ku-band Pencil beam Scatterometer

Radio Occultation Sounder for Atmosphere (ROSA)

LAUNCH: September 23, 2009





Oceansat-2: Orbital Parameters

The Orbit of Oceansat-2 is identical to Oceansat-1

Type	-	Near polar sun-synchronous
Perigee Height	-	720.007 kms
Apogee Height	-	738.079 kms
Inclination	-	98.33 Deg.
Eccentricity	-	0.00127
Period	-	99.382 mts.
Avg Ground Track Vel	-	6.7818 km/sec
Local time of pass	-	12 noon
Repeat cycle	-	2 days



OCEANSAT-2 (PSLV C14)

...to study the physical and biological aspects of oceanography.

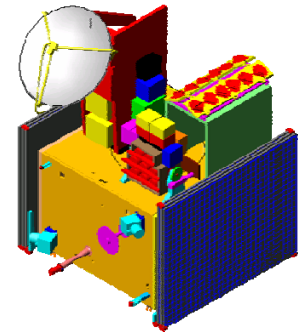


S/C Mass : 956 kg

**Orbit : 720 km
SSO**

Applications:

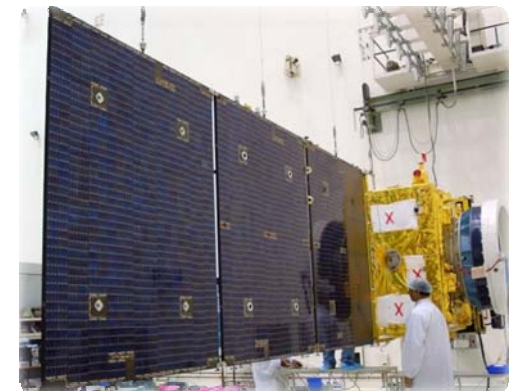
Potential Fishing Zone
Advisories
Ocean State Forecasting
Ocean and coastal studies



S/C undergoing checks at launch pad

PAYLOADS

- An 8-band Ocean Colour Monitor (OCM) with 360 m spatial resolution
- A Ku-Band Pencil beam SCATTEROMETER with a ground resolution of 50 km x 50 km
- Radio Occultation Sounder for Atmospheric studies (ROSA) - Developed by the Italian Space Agency – ASI



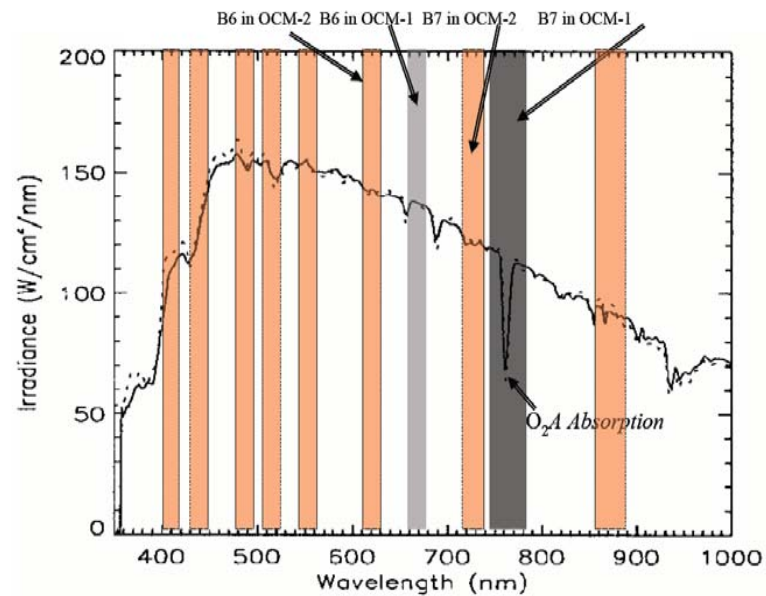
Antenna deployment test at launch pad

Oceansat-2 OCM

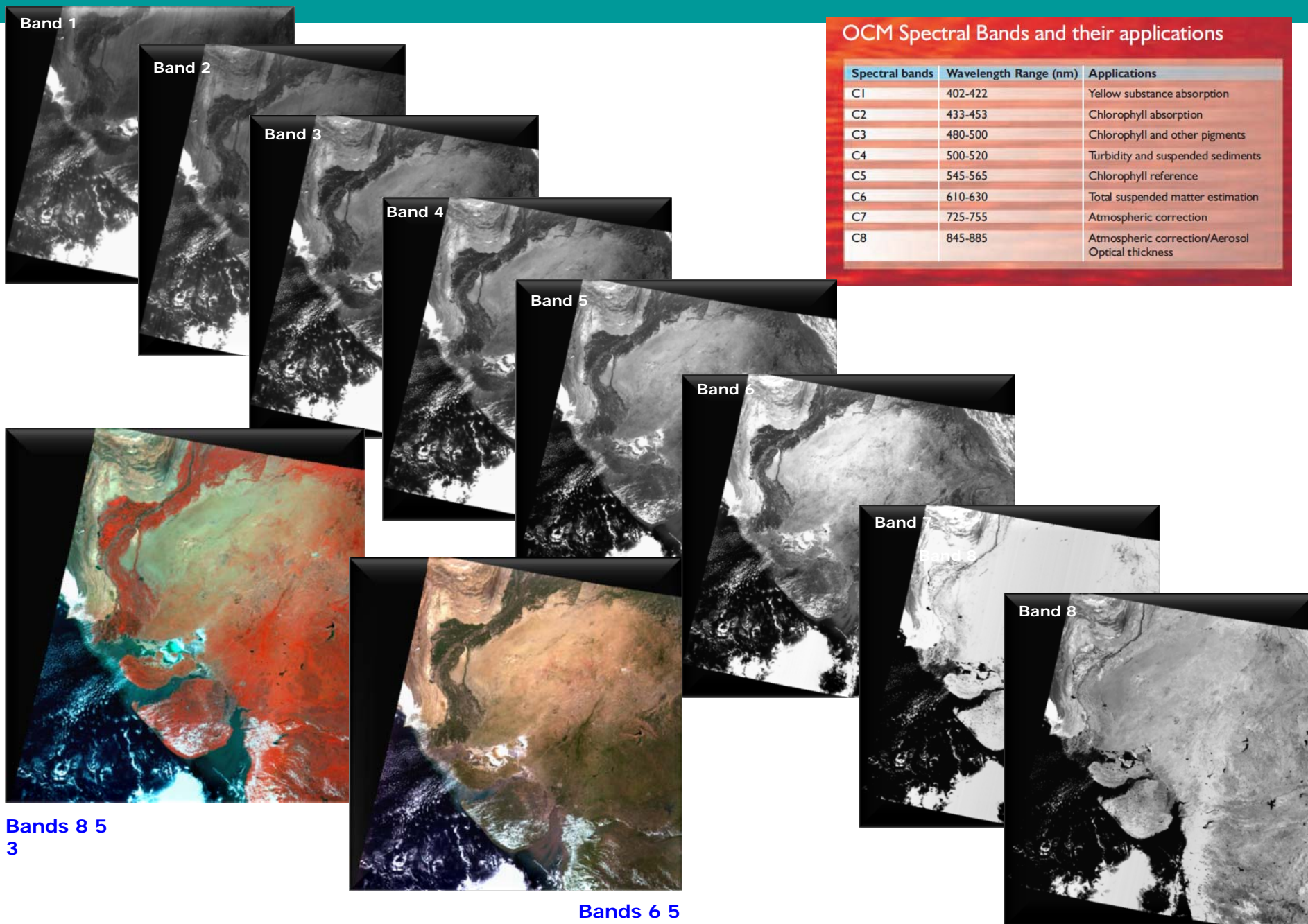


Swath	: 1420 km
IGFOV	: 360x236 m
Repetivity	: 2 days
No. of Bands	: 8 (VNIR)
Quantization	: 12
Data rate	: 21.226 Mbps
Along track steering	: $\pm 20^\circ$
Data rate	: 20.8 Mbps
Data Transmission	: X Band

Band	Wavelength
1	404-424 nm
2	431-451 nm
3	476-496 nm
4	500-520 nm
5	546-566 nm
6	610-630 nm
7	725-755 nm
8	845-885 nm



OCEANSAT-2 OCM Data Products



OCM Spectral Bands and their applications

Spectral bands	Wavelength Range (nm)	Applications
C1	402-422	Yellow substance absorption
C2	433-453	Chlorophyll absorption
C3	480-500	Chlorophyll and other pigments
C4	500-520	Turbidity and suspended sediments
C5	545-565	Chlorophyll reference
C6	610-630	Total suspended matter estimation
C7	725-755	Atmospheric correction
C8	845-885	Atmospheric correction/Aerosol Optical thickness

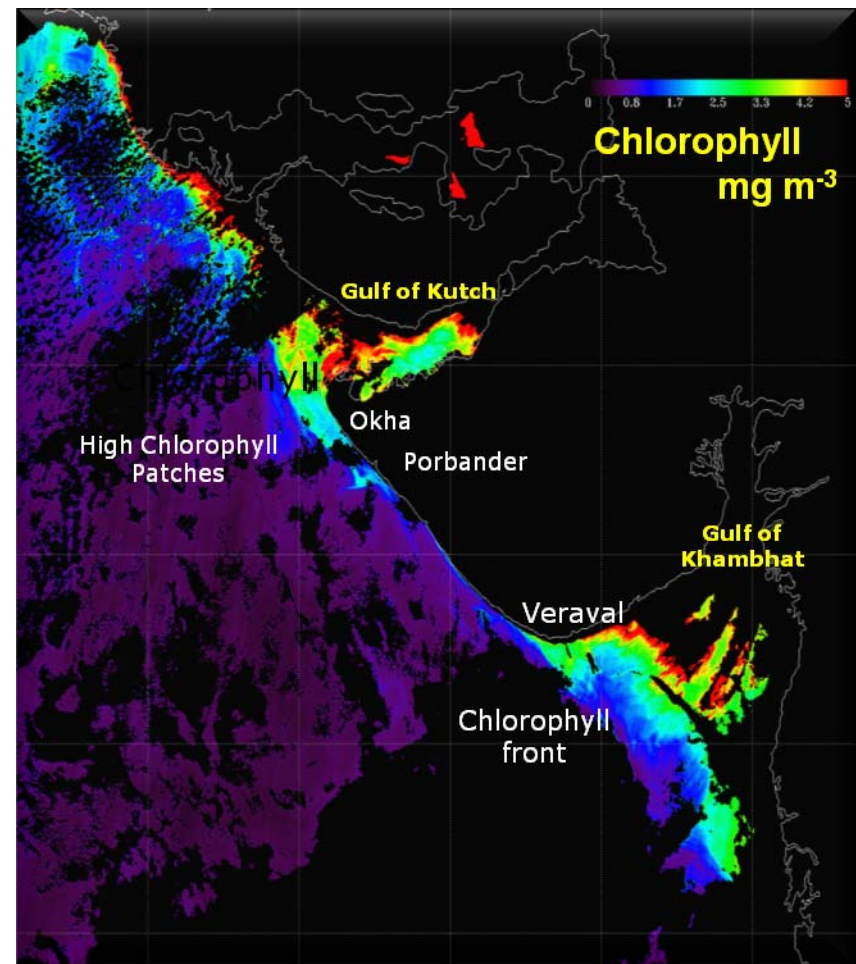
Bands 8 5
3

Bands 6 5

OCEANSAT-2

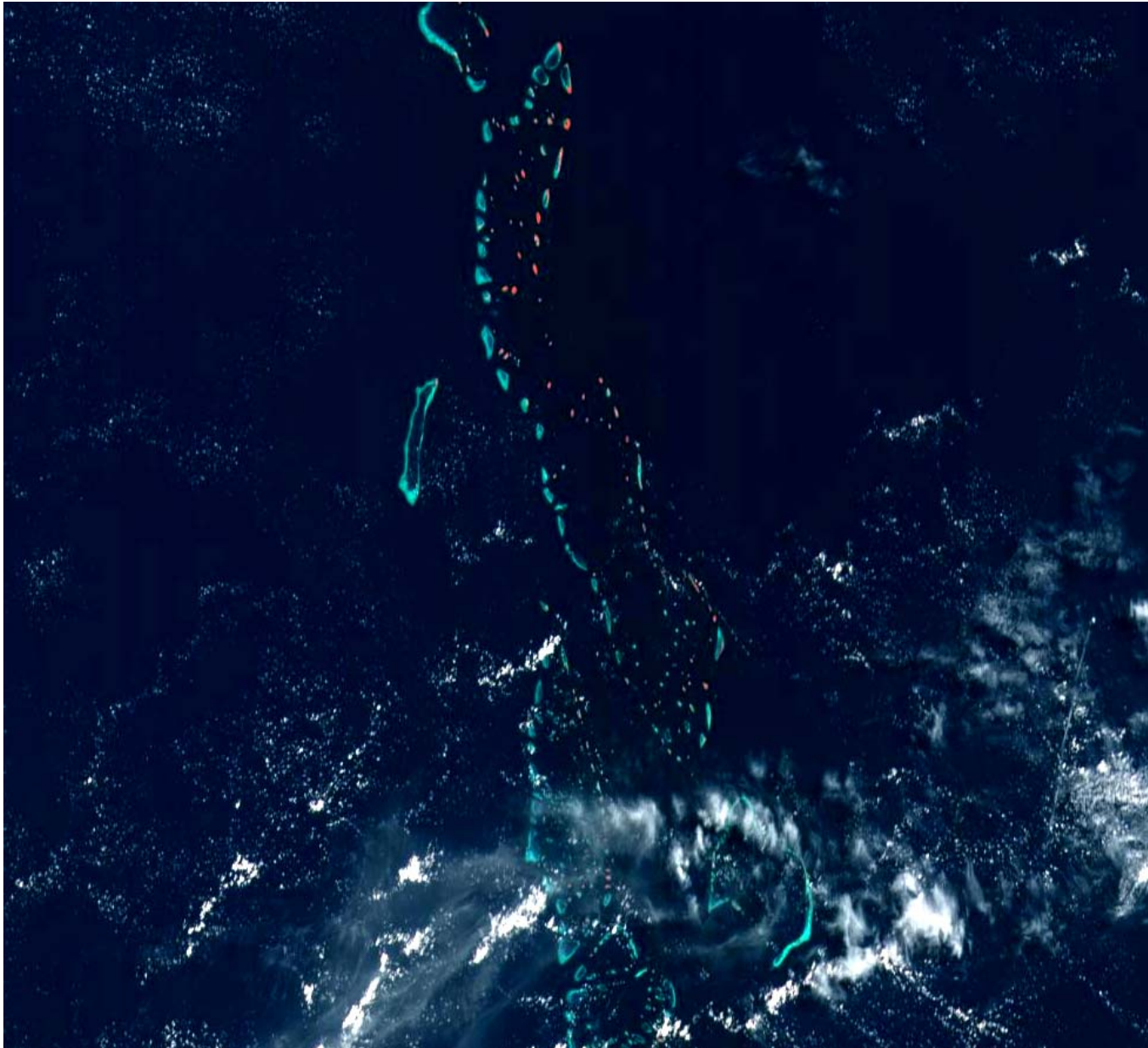
First day image of OCM (24 Sep 2009) Gulf of Kutch & Khambhat, Gujarat coast

Distribution of marine phytoplankton indexed as chlorophyll - a



OCEANSAT- 2

Maldives Islands as seen by OCM on September 24, 2009



Oceansat-2 OCM Data products

LEVEL-1 Product: Basic Data Products

- L1A RAW Products
- L1B Radiance Product
- L1C Radiometrically and Geometrically corrected

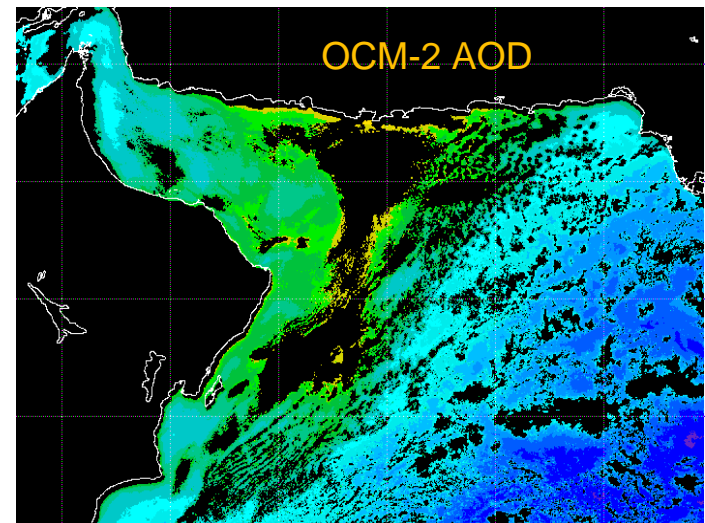
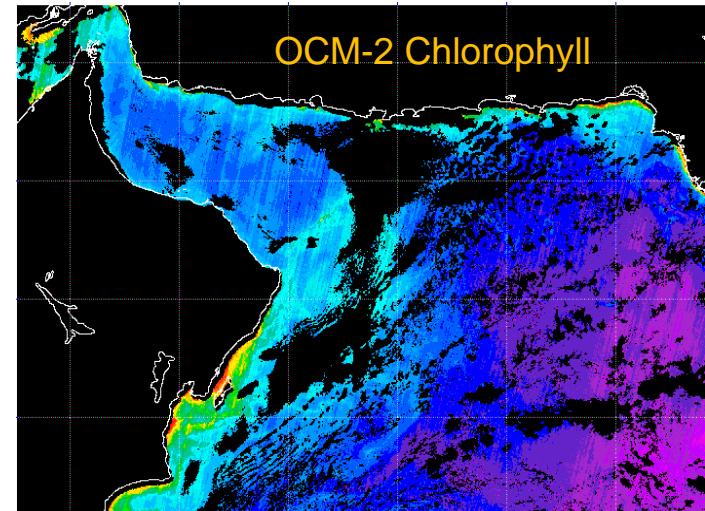
LEVEL-2 Product: Geo-Physical Parameters

- Chlorophyll-a concentration
- Total Suspended Matter (TSM)
- Diffused Attenuation Coefficients (K_d -490 nm)
- Aerosol Optical Depth (AOD) at 865 nm

LEVEL-3 Product: Binned Products (4 km)

- Weekly
- Monthly
- Yearly

Products supported in
HDF 4 format can be
Displayed in SeaDas



OCM-2 Modes of Operation

Oceansat-2 OCM LAC Coverage
360 m Spatial Resolution
Real time transmission



Oceansat-2 OCM GAC coverage
1 Km/ 4 Km Spatial resolution
Onboard recording and Playback

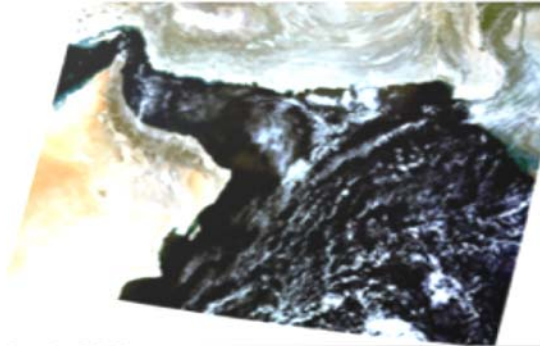


First Day Product from OCM-2 (27 Sep 2009)

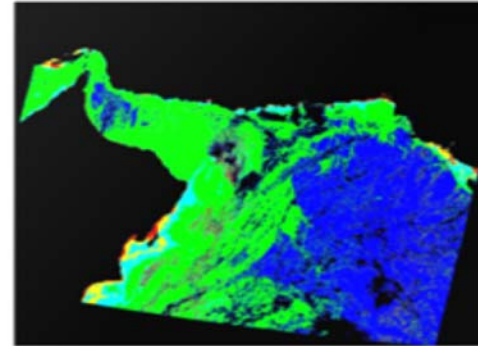


CHLOROPHYLL_a IMAGES OF OCEANSAT-2

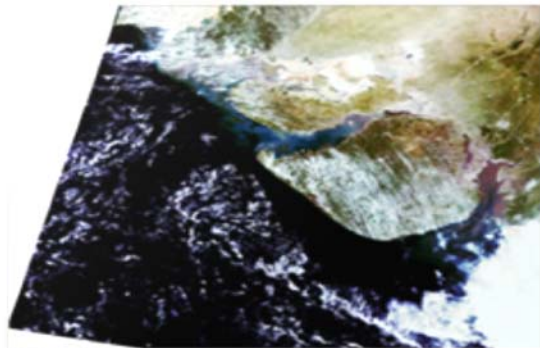
nrsa



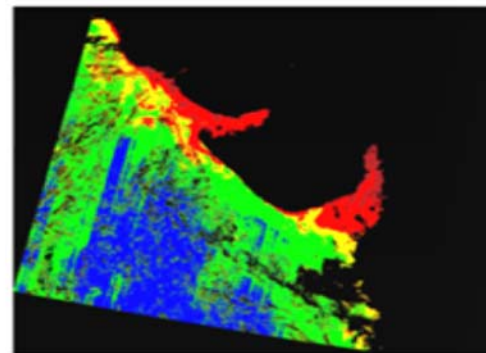
Bands : 6 5 3



Persian Gulf and Eastern Arabian Sea
27 September 2009



Bands : 6 5 3

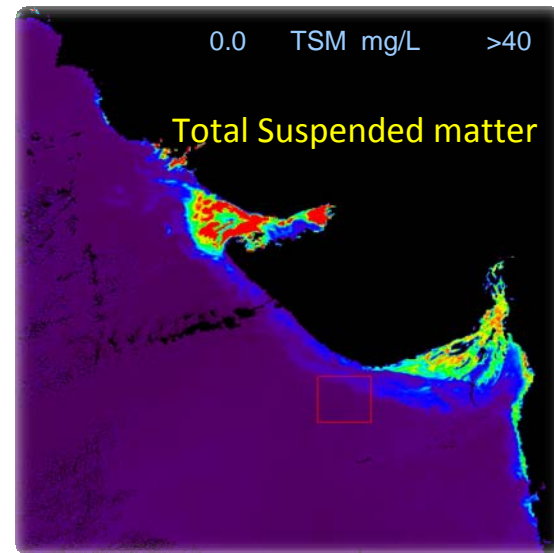
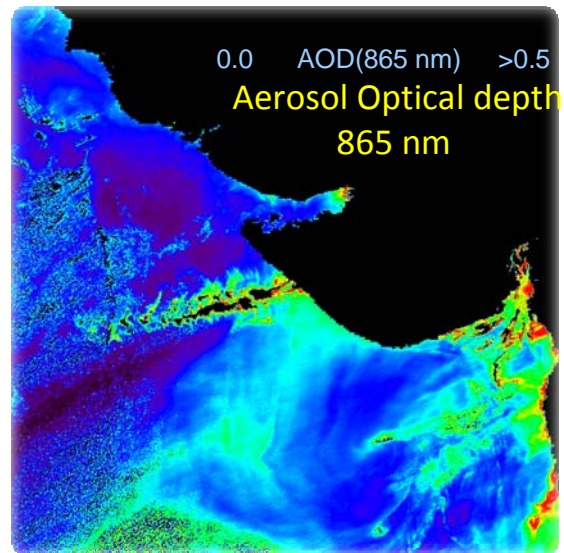
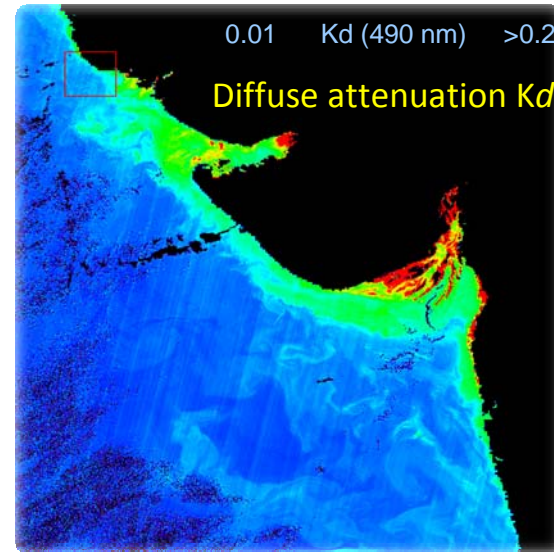
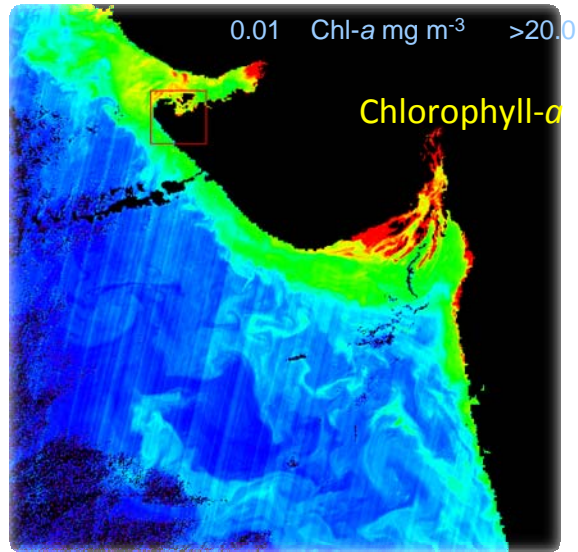


Gujarat coast and Western Arabian Sea
28 September 2009

Chlorophyll_a (mg/m³)

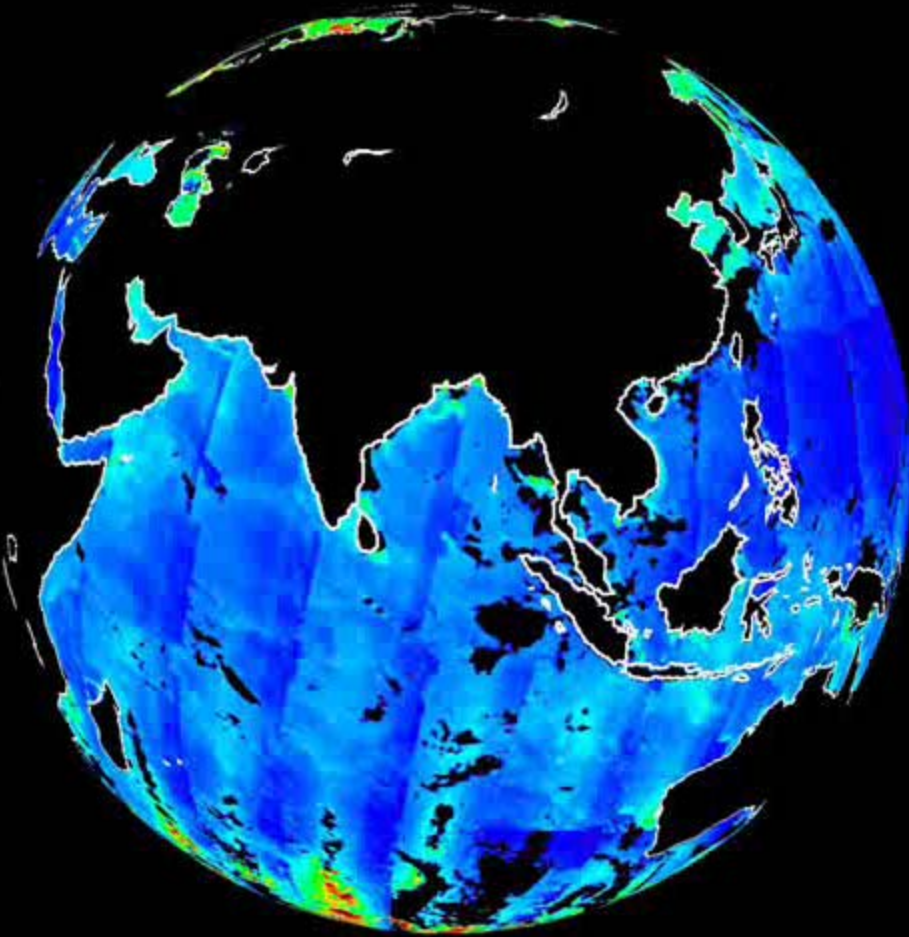


OCM-2 derived Geophysical products

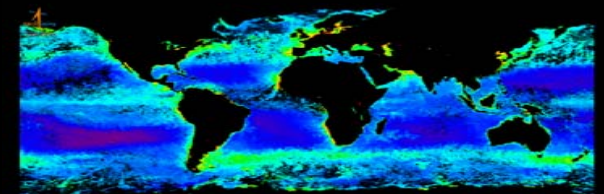


OCM-2 derived Geophysical products

OCM 2 GAC Binned Chlorophyll Product

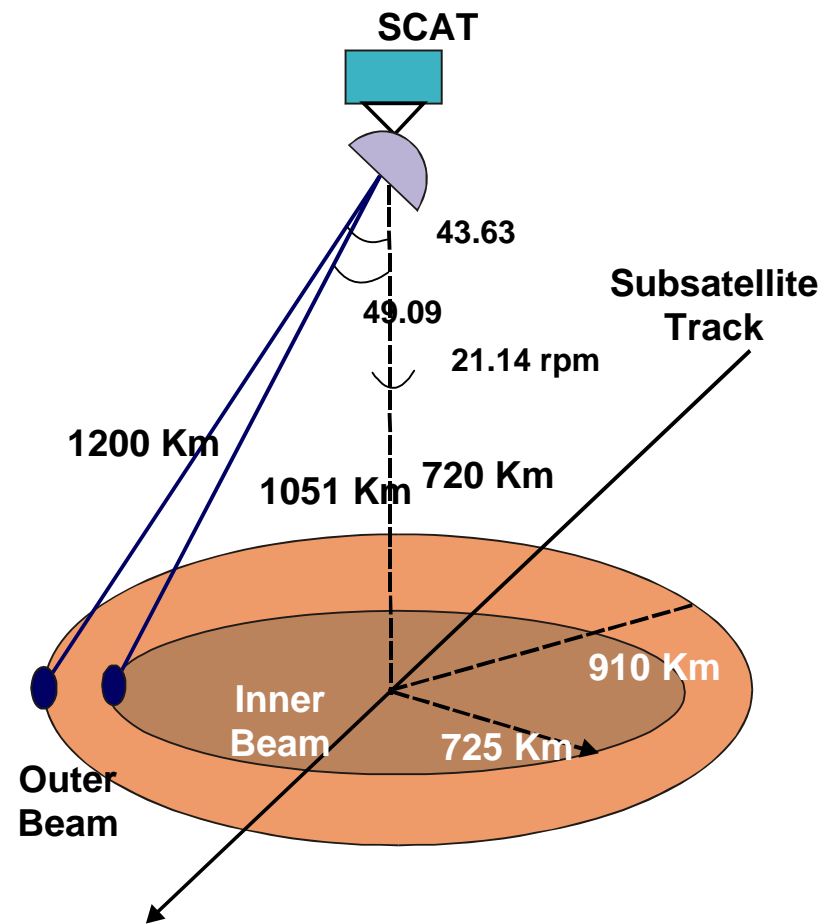


OCM-2 GAC Binned Chlorophyll Product



Scatterometer

PARAMETER	SPECIFICATION
Frequency	13.73GHz
Wind speed range	4 to 24 m/s
Wind speed Accuracy	Better than 20% (RMS)
Wind Direction Accuracy	20° rms
Resolution	50 X50 Kms
Polarisation	HH (inner) VV (outer)
Swath	1450 Km (inner) 1820 km (outer)

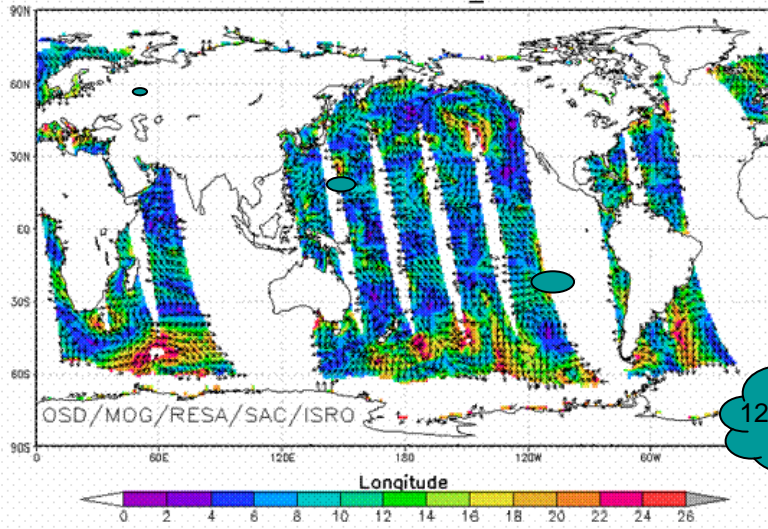


Data Products from Scatterometer

Processing Level	Parameter	Cell Size	Format	Availability
Level 2A	Sigma-0 (for each orbit)	50 x 50 km²	HDF	Selected users
Level 2B	Wind vector (for each orbit)	50 x 50 km²	HDF	Global users through Web
Level 3S	Sigma-0 (Global)	0.5° x 0.5 °	HDF	Global users through Web
Level 3W	Wind vector (Global)	0.5° x 0.5 °	HDF	Global users through Web

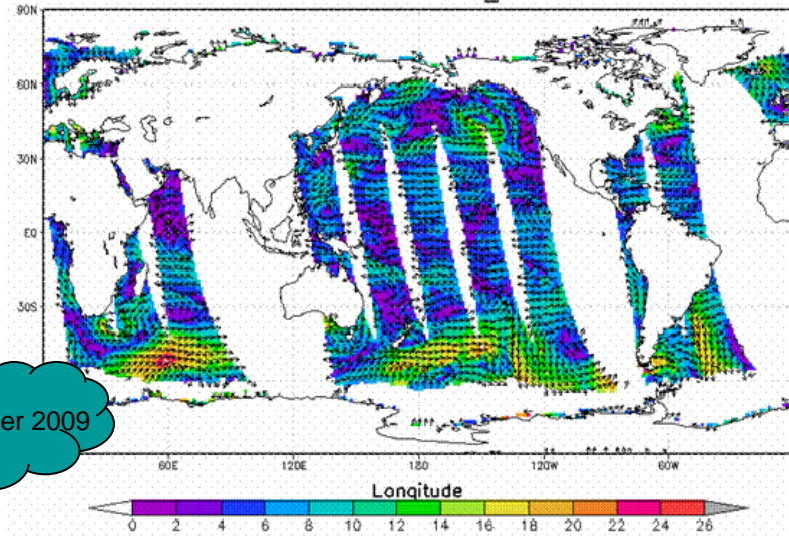
Pre-operational Ocean Surface Winds from Oceansat-2 Scatterometer

Pre-operational Winds from Oceansat-2 Scatterometer
12b-285-new.dat_asc

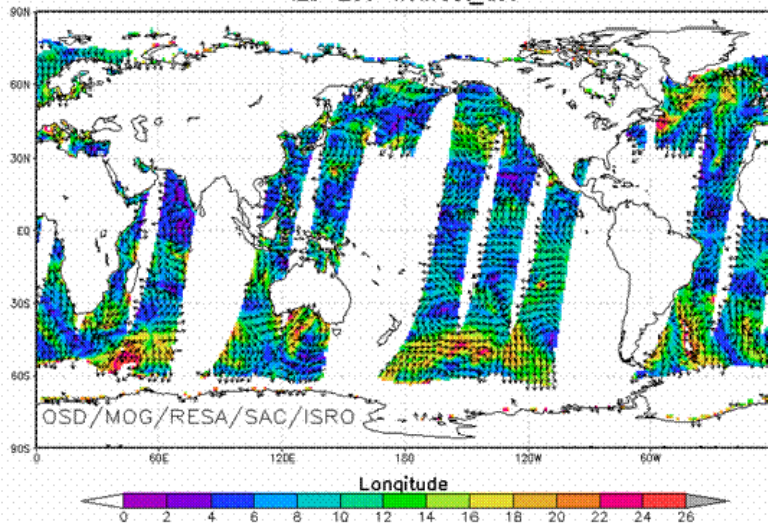


12th October 2009

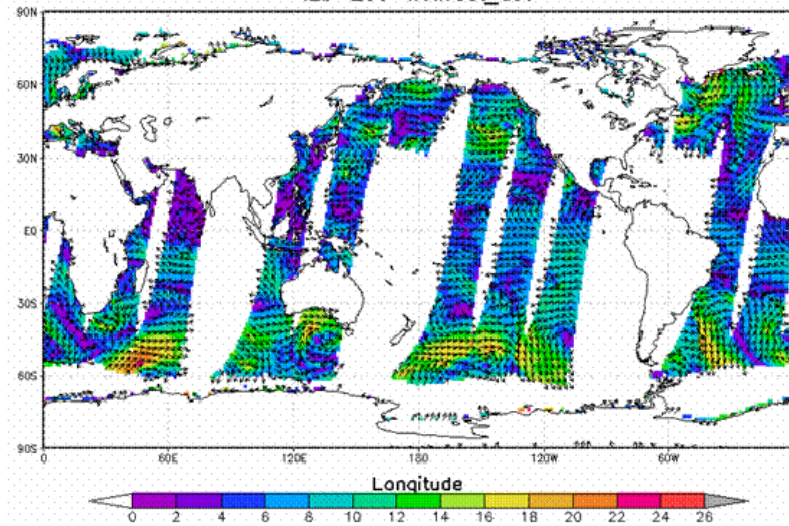
ECMWF Model Winds
12b-285-new.dat_asc



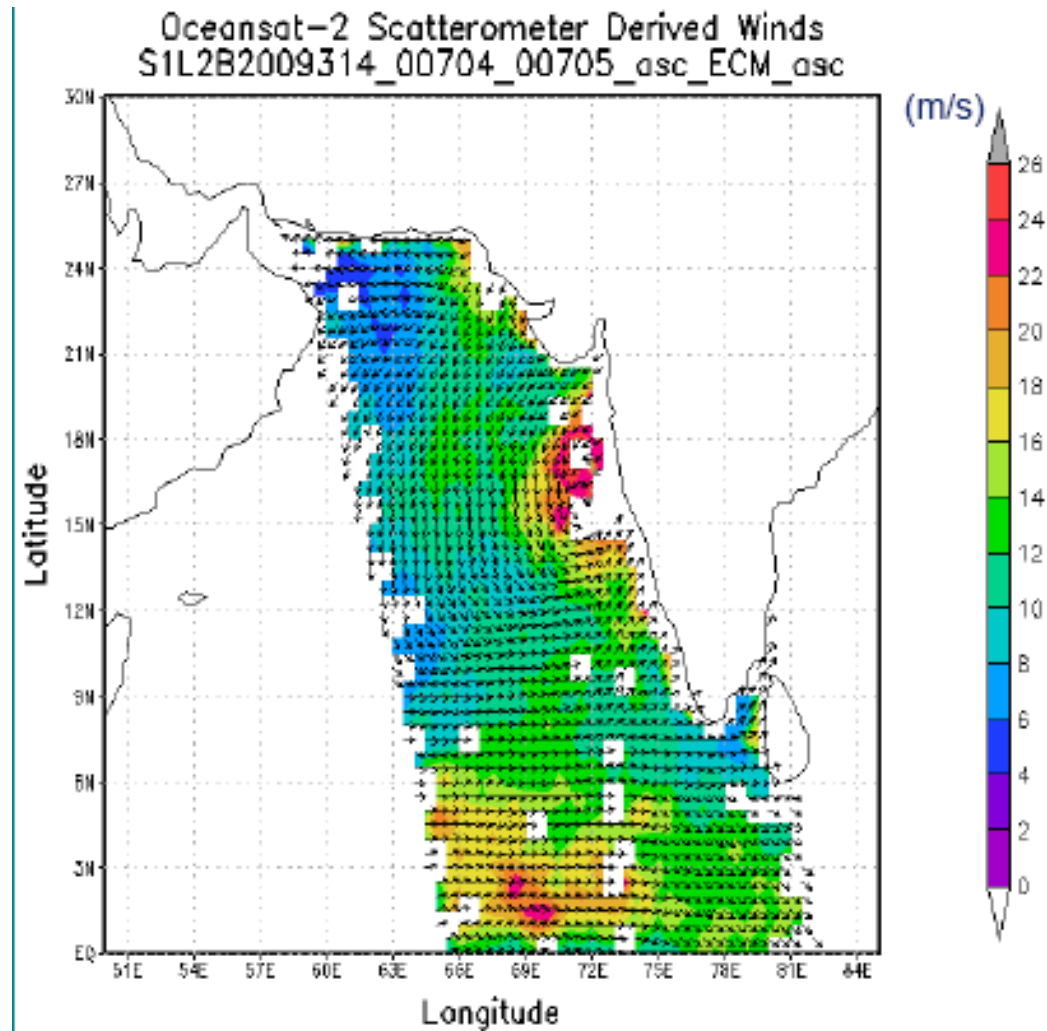
Pre-operational Winds from Oceansat-2 Scatterometer
12b-285-new.dat_dsc



ECMWF Model Winds
12b-285-new.dat_dsc



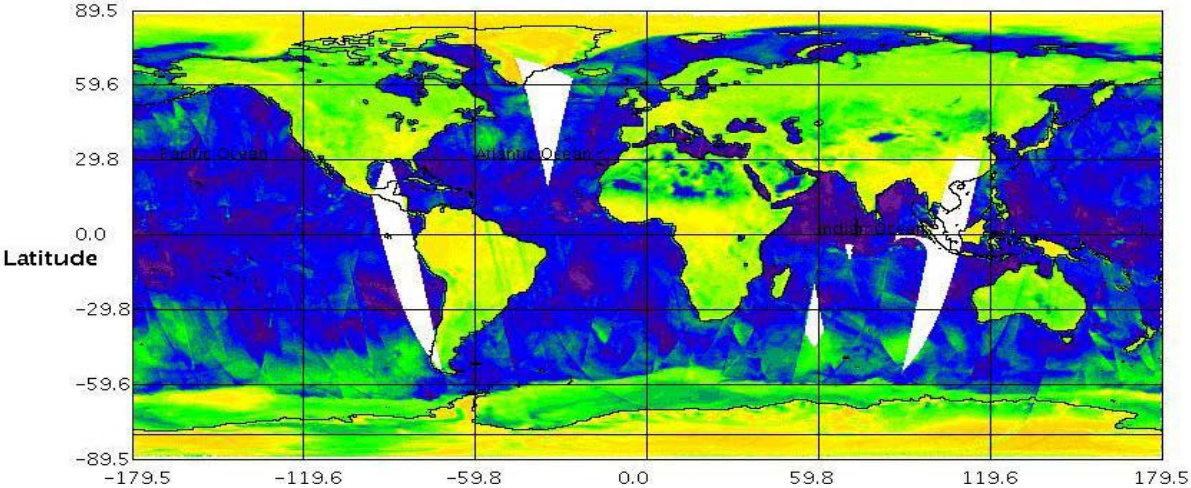
Oceansat-2 Scatterometer derived Wind vectors



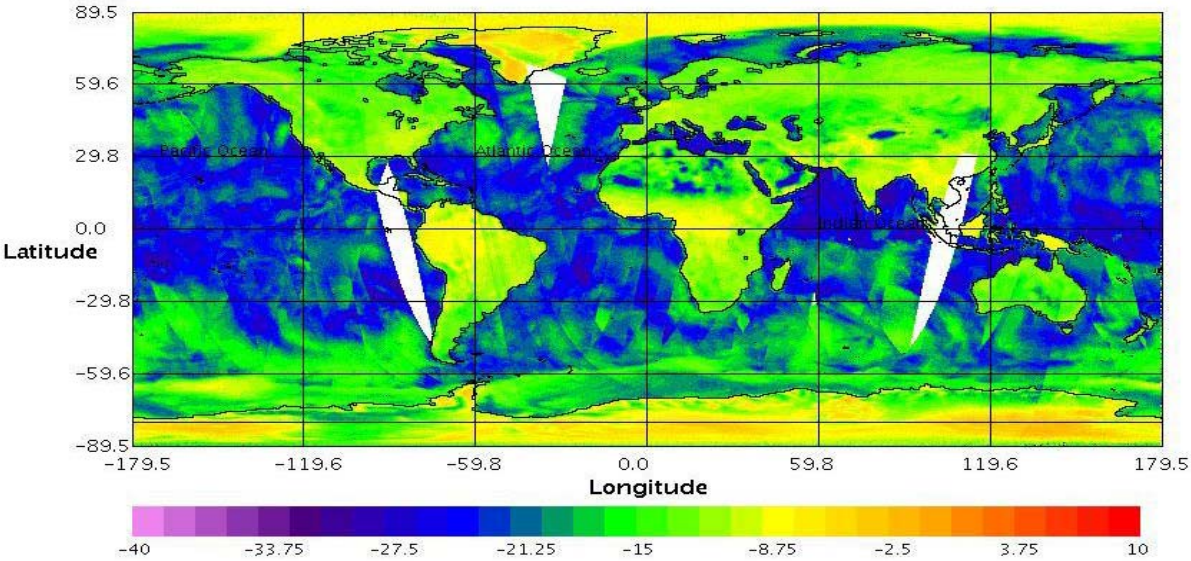
November 10, 2009 : 19 GMT
(Phyan Cyclone)

Oceansat-2 Scatterometer Products (Sigma-0)

Oceansat-2 Scatterometer Sigma-0 (dB) HH polarization Oct 9-10, 2009



Oceansat-2 Scatterometer Sigma-0 (dB) VV polarization Oct 9-10, 2009



Radio Occultation Sounder for Atmosphere (ROSA)



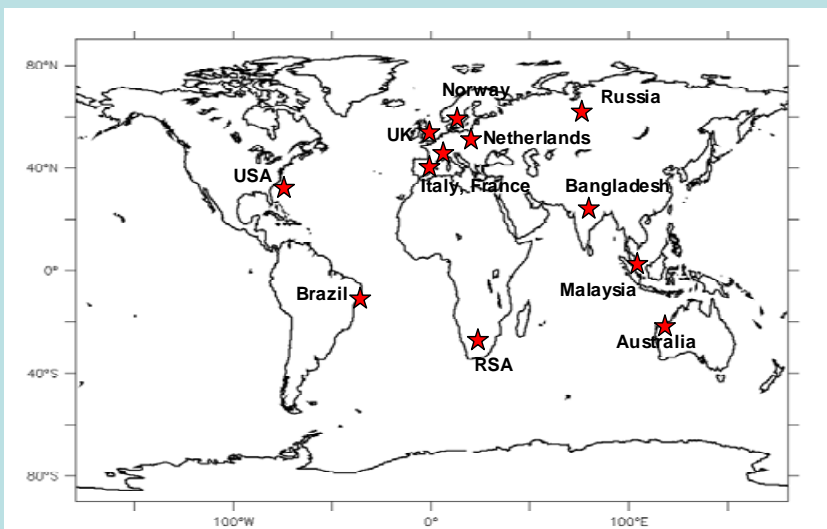
PARAMETER	SPECIFICATION
Frequencies Of Operation	L1 1560 – 1590 MHZ L2 1212 – 1242 MHZ
GPS Codes used	C/A AND P- CODE
Antenna Gain	+ 5 DBI for navigation antenna + 12 DBI for RO antenna
Polarisation	RHCP
Horizontal Resolution	< 300 KMS for temperature & humidity
Vertical Resolution	0.3 KM (Low Troposphere) 1 – 3 KM (High Troposphere)
Accuracy	< 1.0 K Temperature 10 % OR 0.2G/KG Humidity
Input Signal Range	-127 TO –133 DBM POD Antenna -130 TO –148 DBM RO Antenna

Data Availability and Access

- **NRSA Data Center (NDC)** will carry out data dissemination to users.
- **OCM GAC** product of 4 km resolution and Scatterometer Level 2B, 3S & 3W will be made available on the Internet after the Cal/Val phase of the mission
- **OCM LAC** at 360 m resolution will be on real time transmission.

OCEANSAT-2 AO

- **28 projects** received from **12 countries**: Australia, Bangladesh, Brazil, France, Italy, Malaysia, Netherlands, Norway, Russia, South Africa, UK and USA



International Cooperation

Collaboration on data exchange and joint studies on Oceansat-2 is entered / planned with

- **NASA, NOAA**
- **EUMETSAT**
- **ASI**
- **ESA**
- **ECMWF**

Thank you