

ISRO Report on Highlights and Issues in Datasets and Products

Presented to CGMS-50 WG-II Session, Agenda 2

Executive summary

- Presently, 2 satellites INSAT-3D and INSAT-3DR are operational in GEO. Sounder onboard INSAT-3D is not functioning since Sep 2020.
- EOS-06 (Oceansat-3) was successfully launched on 26 Nov 2022 with Ku-band scatterometer, Dual-Band Sea Surface Temperature Monitor (SSTM), and 13-band Ocean Color Monitor (OCM-3).
- In-Orbit Test (IOT) have recently completed and CALVAL phase is going on. Data from Scatterometer and OCM-3 will be released to users very soon. SSTM operations have been stopped due to in-orbit anomaly in its scan mechanism.
- EOS-07 (Microsat-2B) was launched on 10-Feb-2023 in low-inclination orbit with a 6-channel Microwave Humidity Sounder (MHS) onboard.
- ISRO-CNES joint mission SARAL/AltiKa is functioning in mispointing mode and the mission is extended till December 2024 provided the health of the satellite is satisfactory.
- INSAT-3DS is planned to be launched later this year, 2023, with many improvements to mitigate the issue related to the blackbody calibration and mid-night sun-intrusion.
- GISAT-2 is scheduled for launch in March 2024.
- Under GSICS, inter-calibration of IR channels are in demo phase with IASI-B/C and shortly extended to CrIS. Ray-Matching method has been developed for inter-calibration of Vis/SWIR channels using MODIS and 6 years (2016-2021) data has been processed for INSAT-3D/3DR VIS/SWIR channels.

Oceansat-3 (EOS-6)

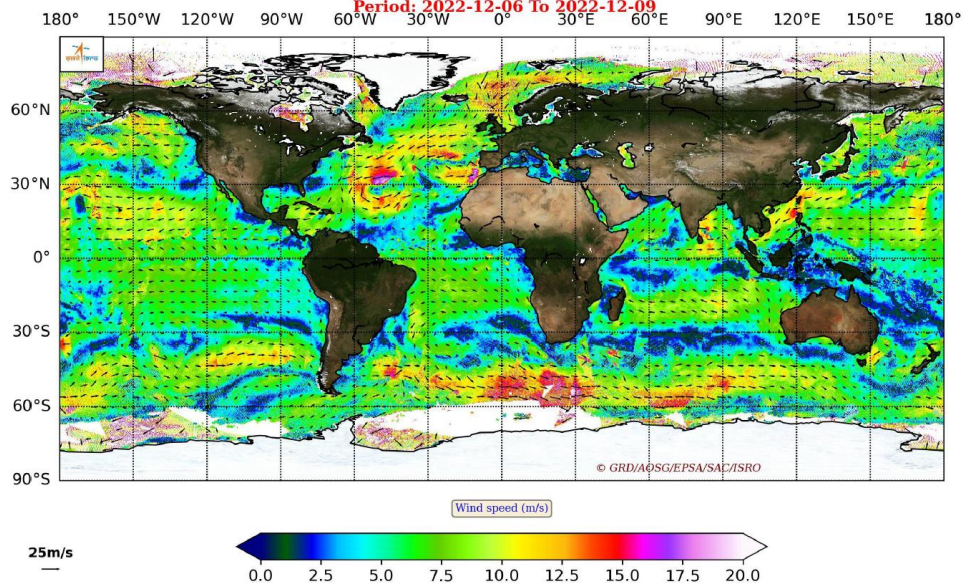
Oceansat-3 Successfully launched on 26 Nov 2022

- Ku-band Scatterometer (SCAT-3) - *High Resolution winds (12.5 km)*
- 13-band Ocean Colour Monitor (OCM-3) - *Narrow bandwidth*
- 2-band Sea Surface Temperature Monitor (SSTM)
- ARGOS by CNES

Oceansat-3 is currently under CALVAL phase and data will be soon released for users

Ocean surface winds (12.5km) as captured by EOS-06 Scatterometer

Period: 2022-12-06 To 2022-12-09



OCM-3

- 13-bands @ 412, 443, 490, 510, 555, 566, 620, 670, 681, 710, 780, 870, 1010 nm
- Narrow Spectral Bandwidth (10-20 nm)
- Improved SNR
- LAC/GAC mode: 366 m / 1.1 km

Scatterometer:

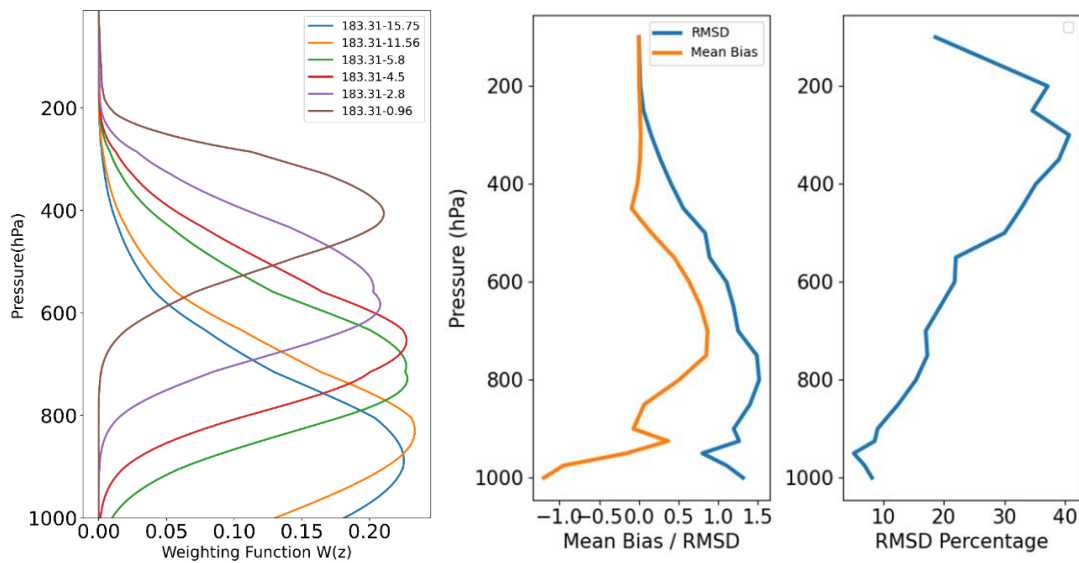
- Ku-band, HH/VV (Swath 1400km), VV (1400-1800km)
- High-resolution mode for ocean surface wind vectors at 12.5 km for the first time in addition to 25 km (Antenna size increased to 1.4m).
- Experimental mode of high resolution wind @5km

SSTM specifications

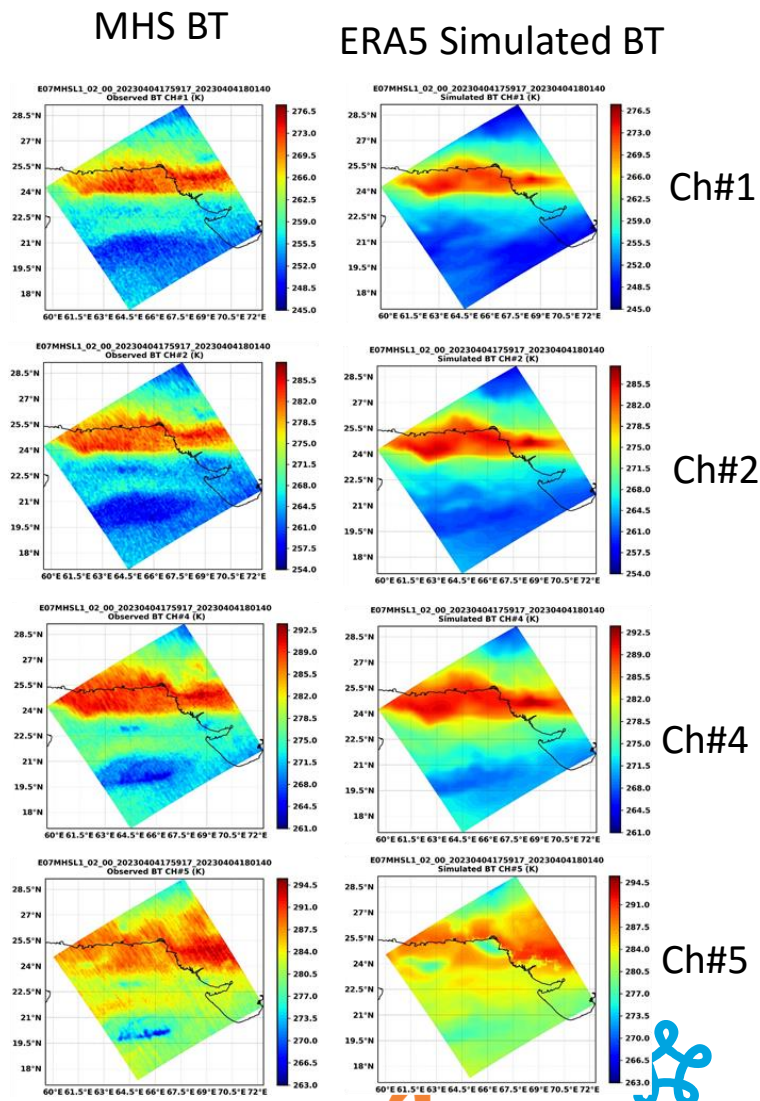
| S. No. | Parameter | Design Goal |
|--------|--|--------------------------------|
| 1 | Instantaneous Geometric Field of View (IGFOV) at nadir (m) | < 1080 m |
| 2 | Spectral bands (μm) | 10.75 - 11.25 11.75 - 12.25 |
| 3 | Band Width (μm) | 0.5 |
| 4 | Swath (km) | 1440 |
| 6 | NEdT @ 300K | < 150mK |
| 7 | Saturation temperature (K) | > 340 |

EOS-07 (Microsat-2B) Microwave Humidity Sounder (MHS)

- Launched on 10-Feb-2023 from SDSC/ISRO, on SSLV-D2
- MHS is a demonstration of in-house developed mm-wave technology
- 6-channel cross-track scanning Radiometer operating at 183.31±15.75 GHz band
- Spatial resolution of 10 km @Nadir



Comparison statistics of MHS L2 vs GFS
(02 Apr 2023, 06:00 UTC)



SARAL/AltiKa: ISRO-CNES Joint Altimeter Mission

(An assessment of geophysical parameters for various phases of operations)

SARAL/AltiKa : Launched Feb, 2013 (First Ka-band Space-borne Altimeter)

10-years of operation and still going strong!

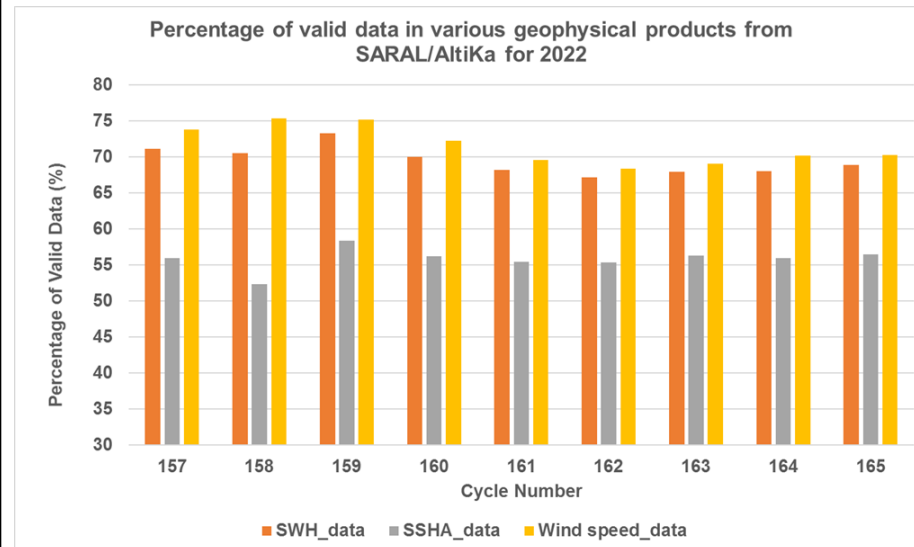
Important component of operational oceanography

Three phases of operations

- Exact Repeat Mode (ERM) – Mar,13 – Jul,16
- Geodetic Mode (GM)- Jul, 16-Jan,19
- Star Sensor anomaly phase (large mis-pointing) Feb, 19 onwards

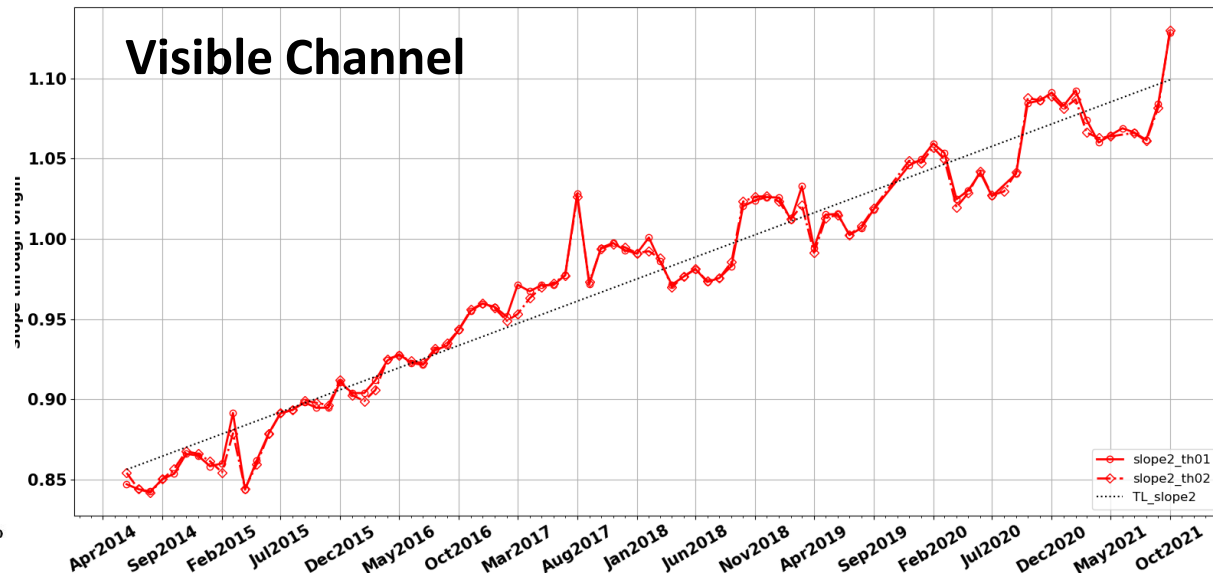
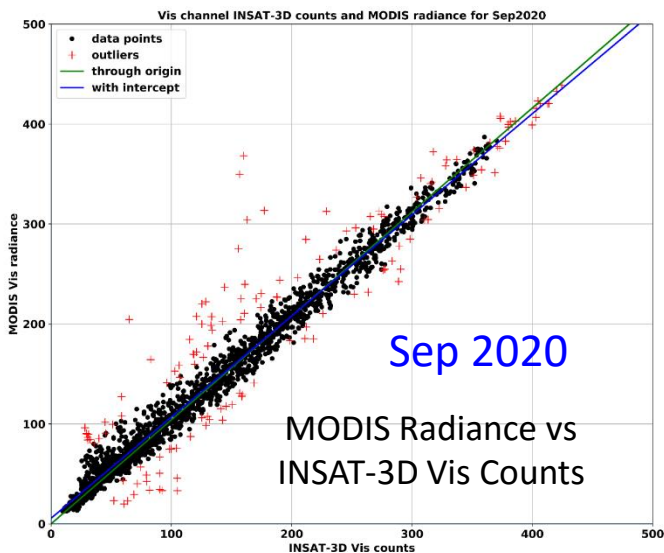
Assessment for the year 2022

- Nearly 55% of SSHA data, 72% of Wind speed data and 68% of SWH data still remain usable for various ocean applications
- Significant Wave Height (SWH) data still being used in operational wave forecasting models.



ISRO's GSICS Activities, Action & Achievements Summary

- Regular monitoring of INSAT-3D/3DR imager IR channels with respect to IASI on-board (MetOp-A/B/C)
- Generated the gain coefficients for visible and SWIR channels of INSAT-3D using ray matching method with MODIS as reference instrument.
- Completed a case study to diagnose the calibration anomalies of INSAT-3D/3DR IR channels during pre and post flip period.
- Reprocessing of the INSAT-3D/3DR Imager data to fix the issues related to the Satellite Yaw-flip operation during eclipse period is undergoing.



Thanks