Jason-2/OSTM Near Real-Time Product Validation at NOAA

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Abstract

One of NOAA's roles as an operational partner in the Jason-2/OSTM mission is the generation and distribution of near real-time (NRT) science products. This includes a high-level project requirement to deliver 75% of the measurements within three hours of acquisition, and 95% within five hours. Validation of the quality of the NRT products, the Operational Geophysical Data Records (OGDRs), is being performed by NOAA's Laboratory for Satellite Altimetry (LSA) and its collaborators.

Our validation activities include operational product monitoring with the Near Real-Time Altimeter Validation System (NRTAVS), global cross-calibration of the Jason-2 OGDR and Interim Geophysical Data Record (IGDR) data sets, cross-calibration of Jason-2 and Jason-1 products via the Radar Altimeter Database System (RADS), and in situ calibration with the global tide gauge network. The calibration/validation effort includes an analysis of all the geophysical and model corrections used to derive sea surface height and its anomaly relative to a mean sea surface from the fundamental range measurement. Height biases and temporal drifts are estimated between products, between the two Jason missions, and relative to the tide gauge records.

Results

- SSH bias between J2-J1 IGDRs is ~ 82 mm
- New GSFC orbits greatly reduce geographic errors
- A/JMR wet correction shows most cycle-by-cycle variability
- DORIS/DIODE orbit error of 10-20 cm in J2-OGDRs
- **Evidence of telemetry dump boundaries in NE Atlantic**
- Yaw change events evident in cycles 4 & 5
- Improved DIODE orbits after table upload on 25-Sep-2008
- SSH corrections between J2 OGDR & IGDR agree to mm
- Tide gauge calibration consistent with 82 mm J2-J1 bias
- J1 & J2-I/OGDR show 1-2 cm variations relative to gauge
- SWH & Wind speed agree very well for J2-OGDR vs. IGDR
- **J1 vs. J2 IGDR wind speed exhibits unexpected kink**
- NRTAVS monitors SSHA, SWH, Wind Speed & corrections
- Per parameter: mean, s.d, # points, histogram & maps
- Plots & stats on web 30-45 minutes after telemetry dumped

Conclusions

The Jason-1 and Jason-2 satellites and instrument payloads are much more similar than Jason-1 was to Topex/Poseidon. This has made the task of cross-calibrating J1 & J2 much easier, and has resulted in a very good level of agreement between the IGDRs within just a few cycles since launch. A consistent relative bias of ~ 82 mm (J2-J1) is observed.

The Jason-2 near real-time OGDR contains wind speed and wave height, but additionally sea surface height, the onboard DORIS/DIODE orbit, and all geophysical corrections. The DIODE orbits exhibit radial orbit error as large as 20 cm. However, after a pole location table upload in late September a marked improvement has been observed.

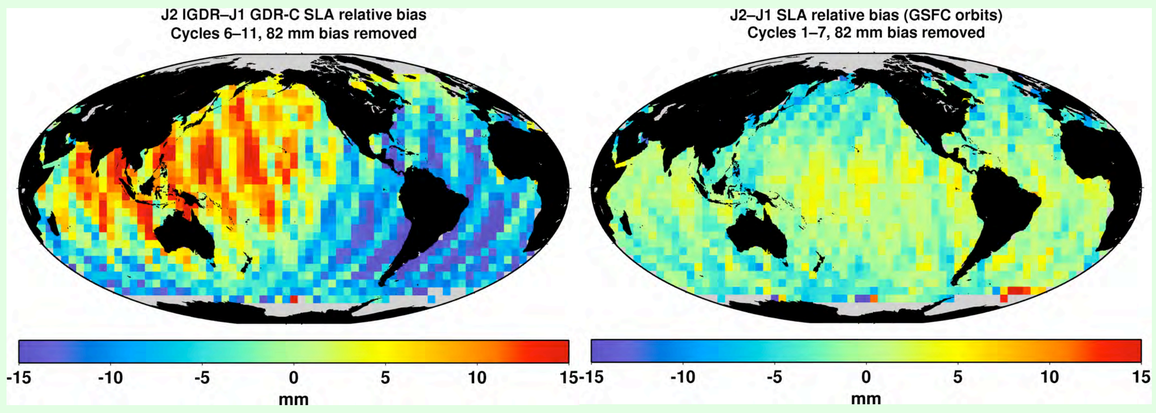
Two new anomalies were detected in this analysis:

1) There are jumps in OGDR-IGDR SSH differences at the boundaries of telemetry dumps associated with Usingen
2) The Jason-1 & Jason-2 IGDR wind speeds exhibit a kink in the correlation scatter plot, perhaps associated with sigma-0 biases before the wind speed model computation.

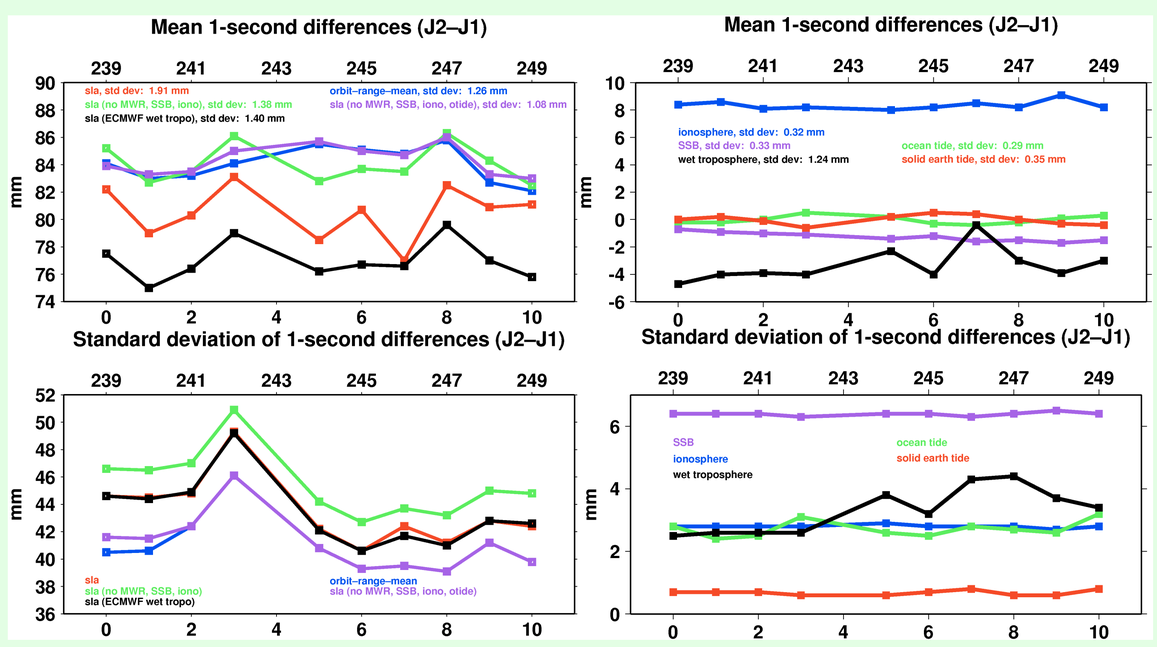
Overall, Jason-2 is performing extremely well!

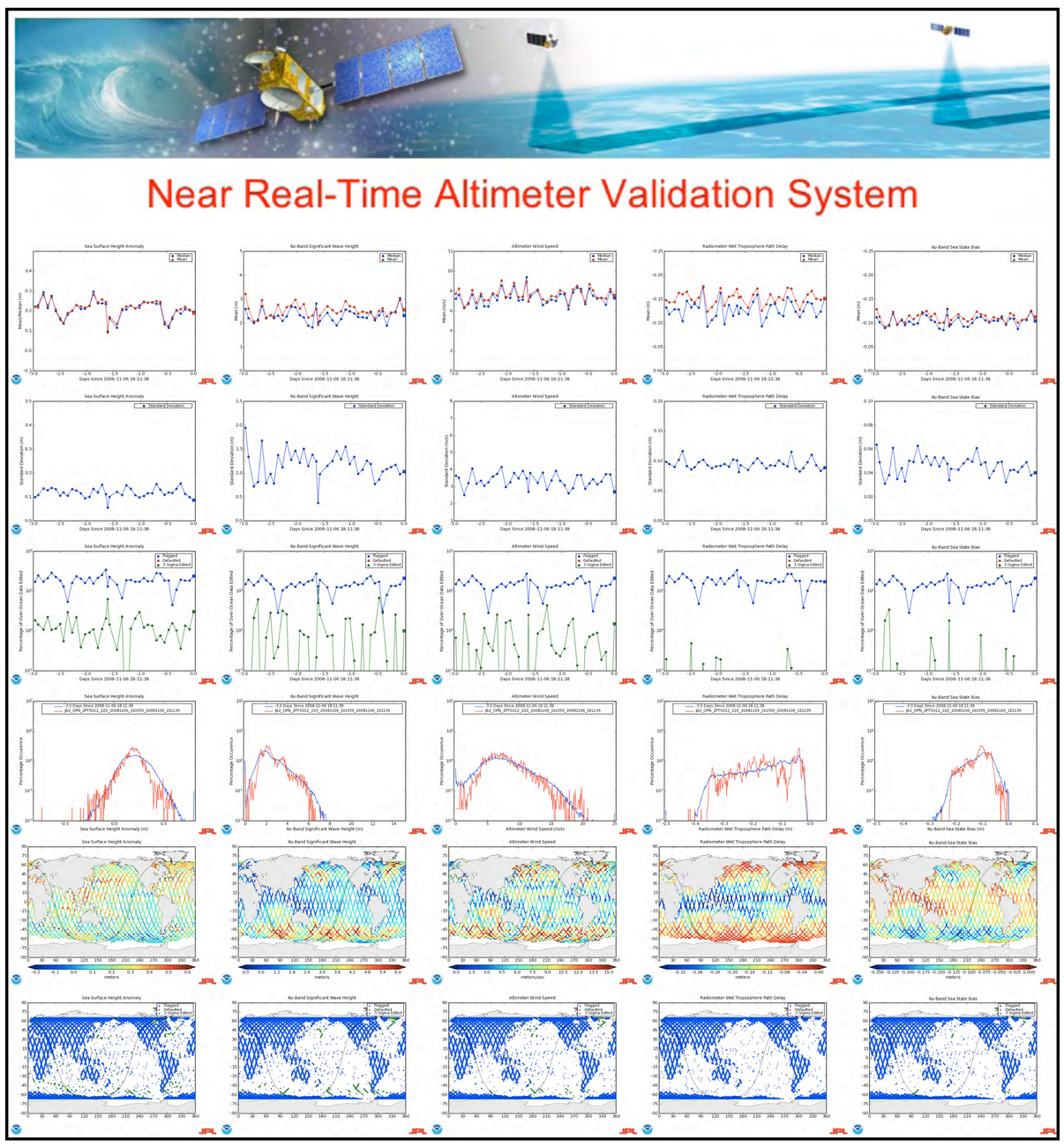
Jason-2 vs. Jason-1 IGDRs

Relative Biases over 6-Cycles: GDR-MOE vs. GSFC POE



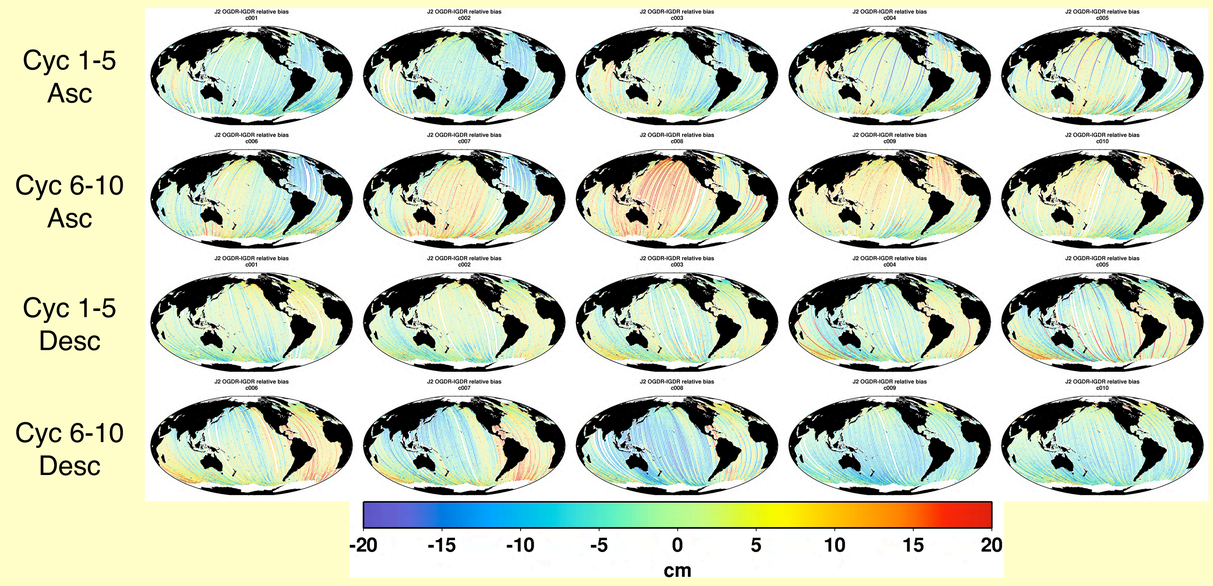
Time Series of SSH and Correction Differences



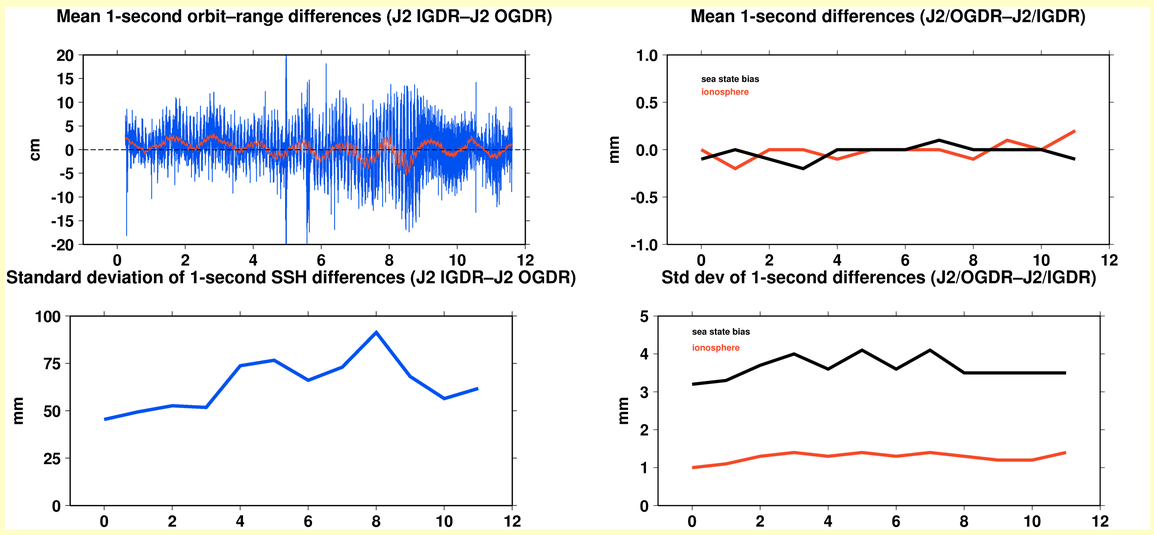


Jason-2 OGDRs vs. IGDRs

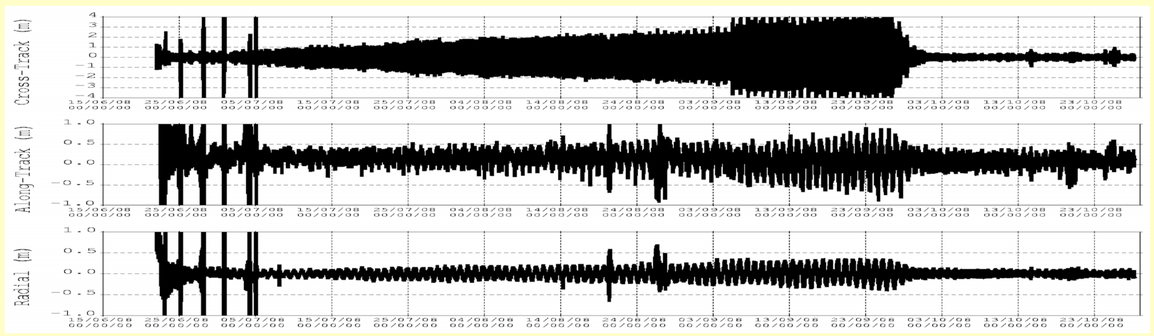
OGDR - IGDR Cyclic Sea Surface Height Differences



Time Series of SSH and Correction Differences



Jason-2 DORIS/DIODE vs. MOE Orbits



Tide Gauge Calibrations & Wind/Wave Comparisons