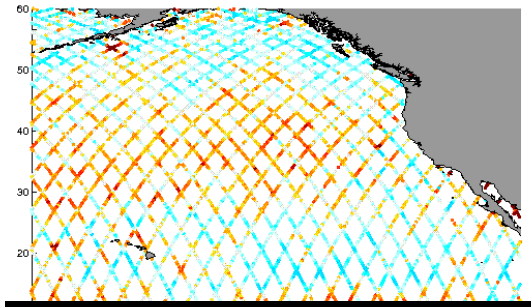
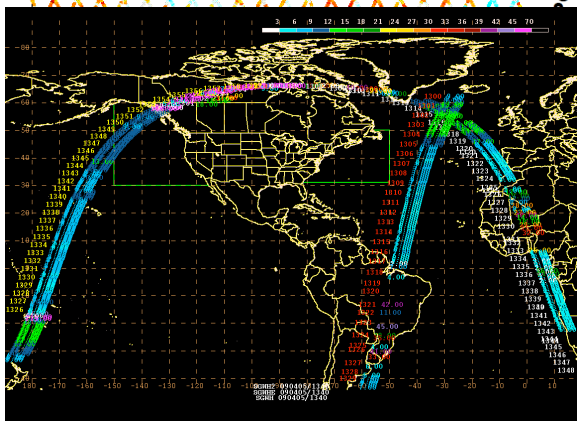
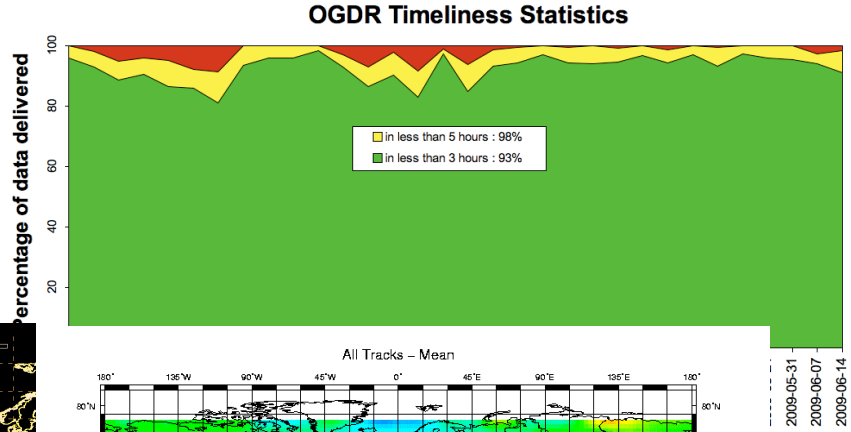
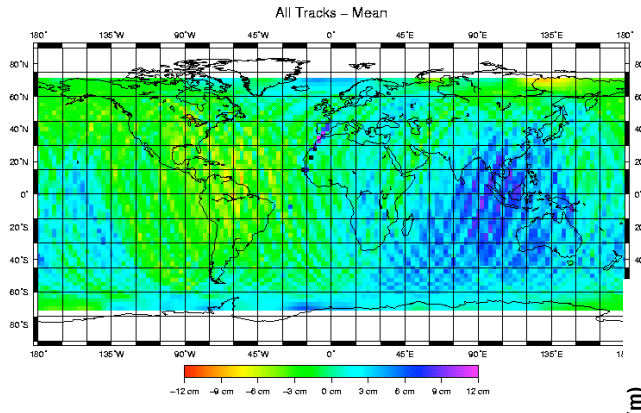
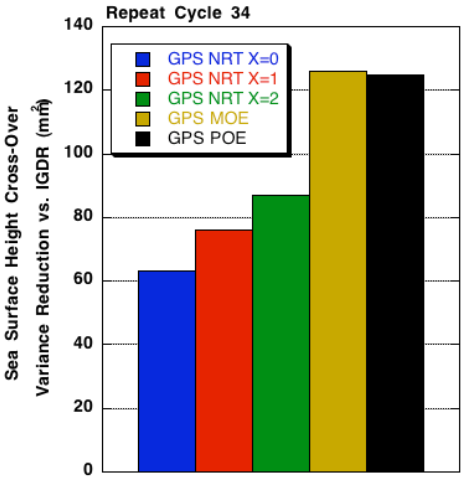
Near Real Time Splinter Summary

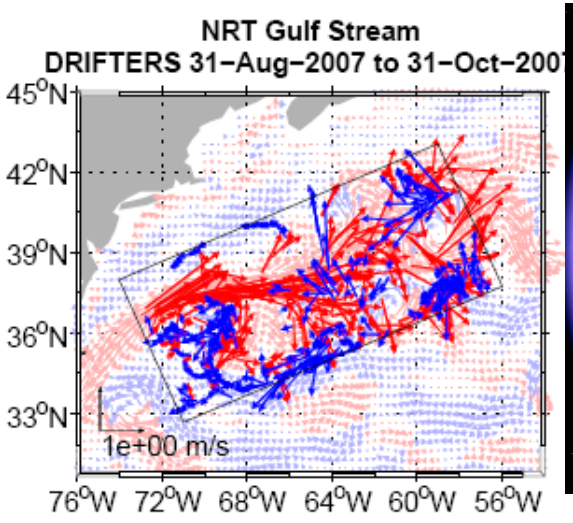


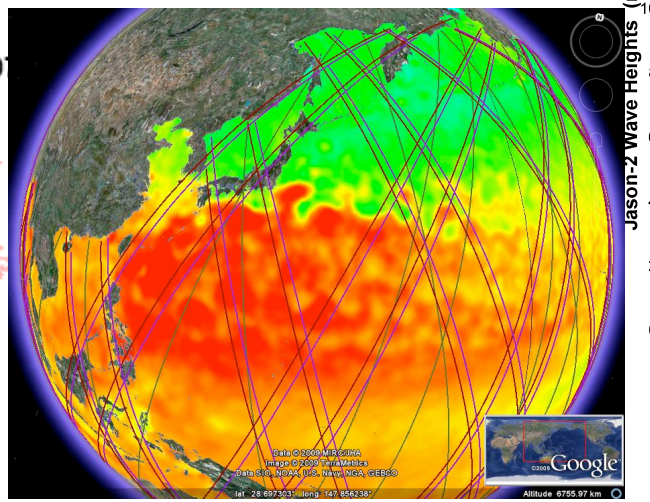


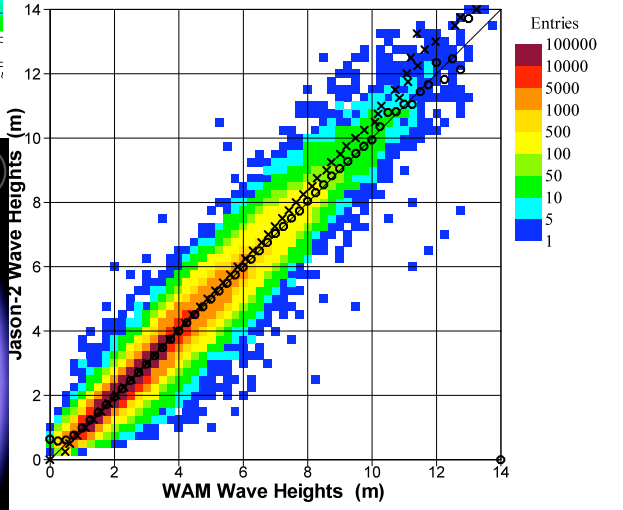












Jason-2 relative to NPOESS IORD-II Requirements

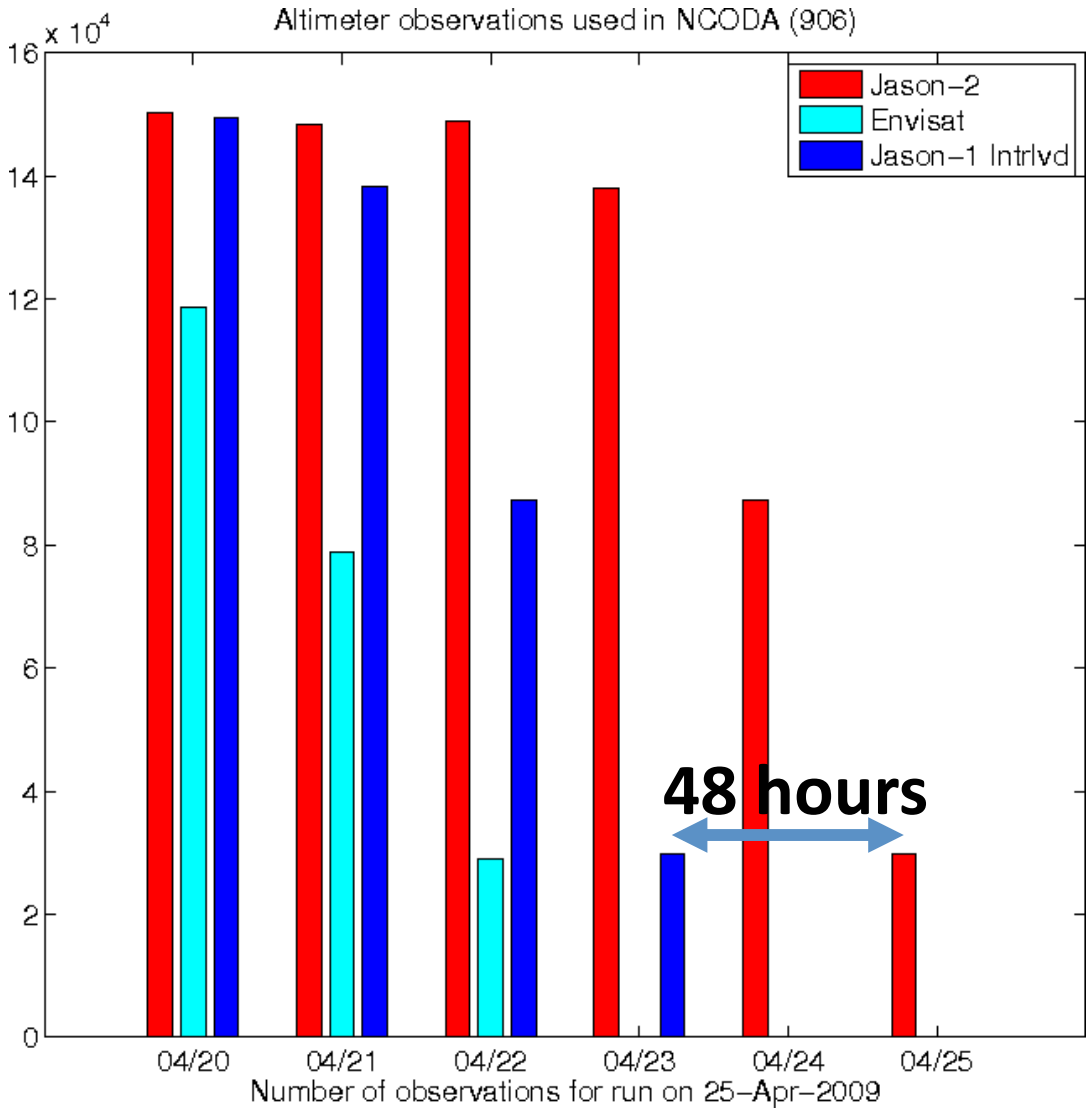
Systems Capabilities	Thresholds	Objectives
b. Measurement Precision	3 cm	2 cm
c. Measurement Accuracy		
1. Mesoscale	6 cm	4 cm
2. Basin Scale	5 cm	3 cm

Jason-2 OGDR

Precision:	1.96 cm RMS
Accuracy lower bound:	2.26 cm RMS
Accuracy upper bound:	5.49 cm RMS

Jacobs, Lillibridge, Tabor, May, Russell

Relative Latency

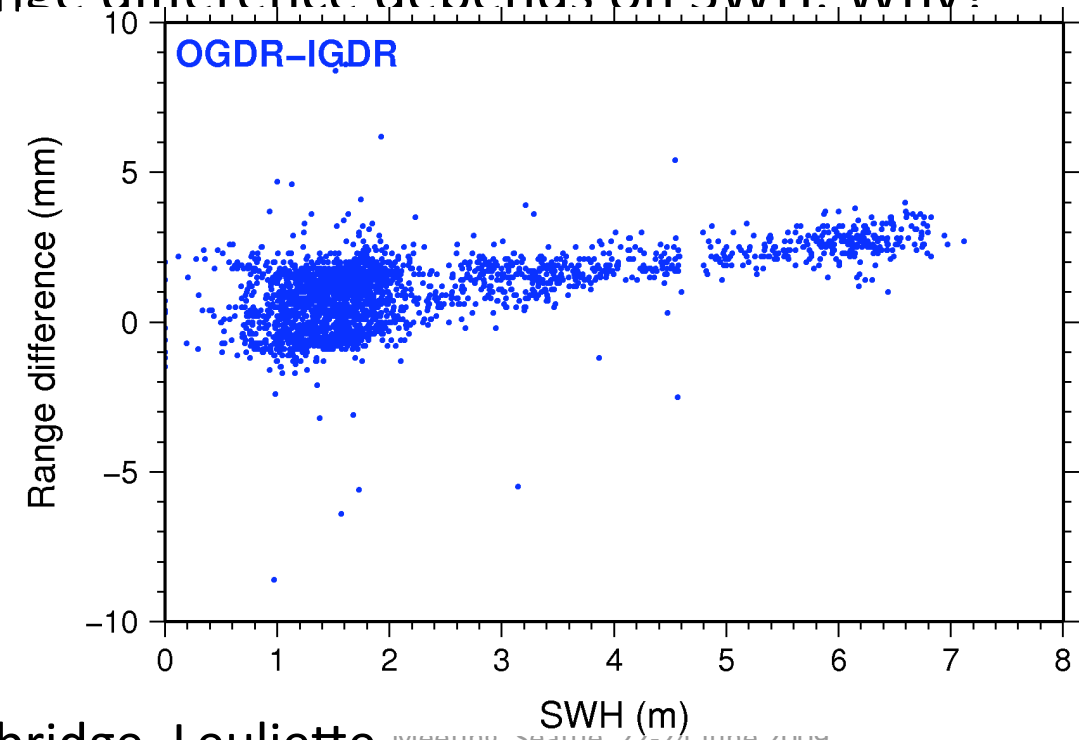


Number of data points from prior days used in the 25 Apr 2009 global assimilation from available data streams.

Jacobs, Lillibridge, Tabor, May, Russell

Range difference OGDR-IGDR

- Cycle 34, pass 115
  - Has identical time tags on OGDR and IGDR
  - Range, SWH, Sigma0 differences can be quite significant over land
  - Retracker convergesnce depends on initial height
  - Range difference depends on SWH. Why?



Lingering issues

- All products
  - High noise in sigma0
    - Graham Quartly suggests an empirical fix
    - Pierre Thibaut suggests computing sigma0 with MLE3
  - SSB should be different from Jason-1
    - New model needed
  - Rain flag never set
    - Algorithm was based on MLE3, no more applicable
  - Long-period non-equilibrium tide is erroneous
    - Contains part of equilibrium tide. Ignore, is small.
  - Pole tide over inland seas and lakes is as over ocean
    - Should be as over land; simple scale factor
  - All AMR measurements are moved 1 second down the track
    - Applies also to JMR

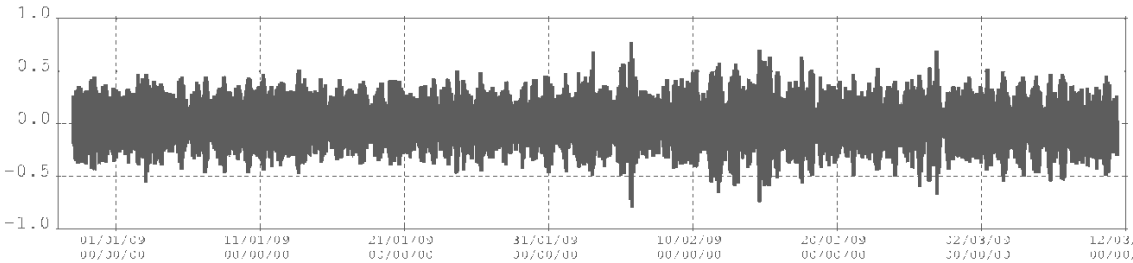
First two months of 2009

(Diode-POE)
Units = meters

Jason-2 on-board DIODE issue // POE, January/February 2009

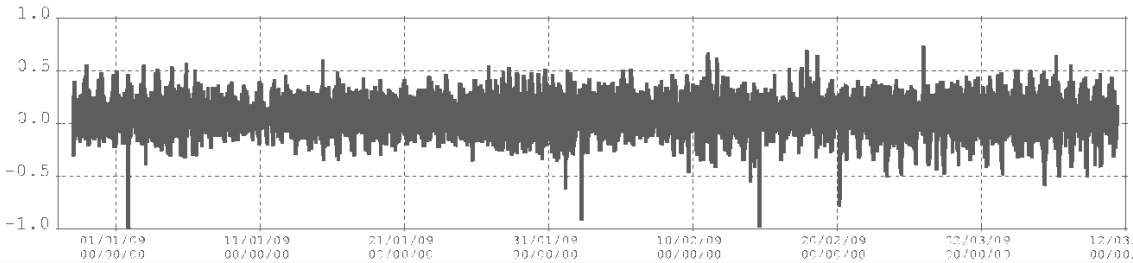
STATS (m)

Cross-Track :



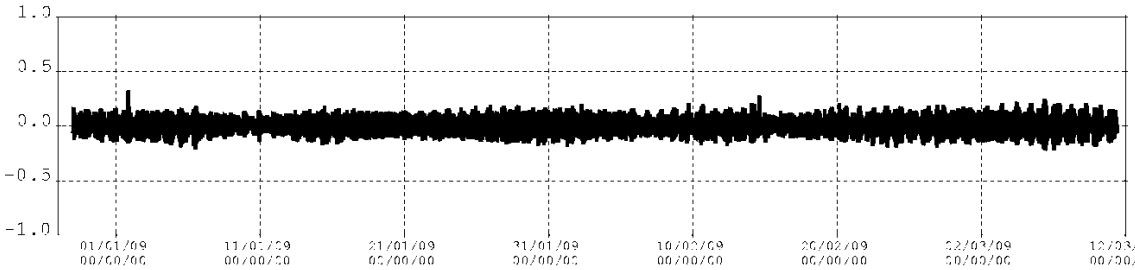
MAX = 0.796
RMS = 0.200

Along-Track :



MAX = 1.096
RMS = 0.167

Radial component :

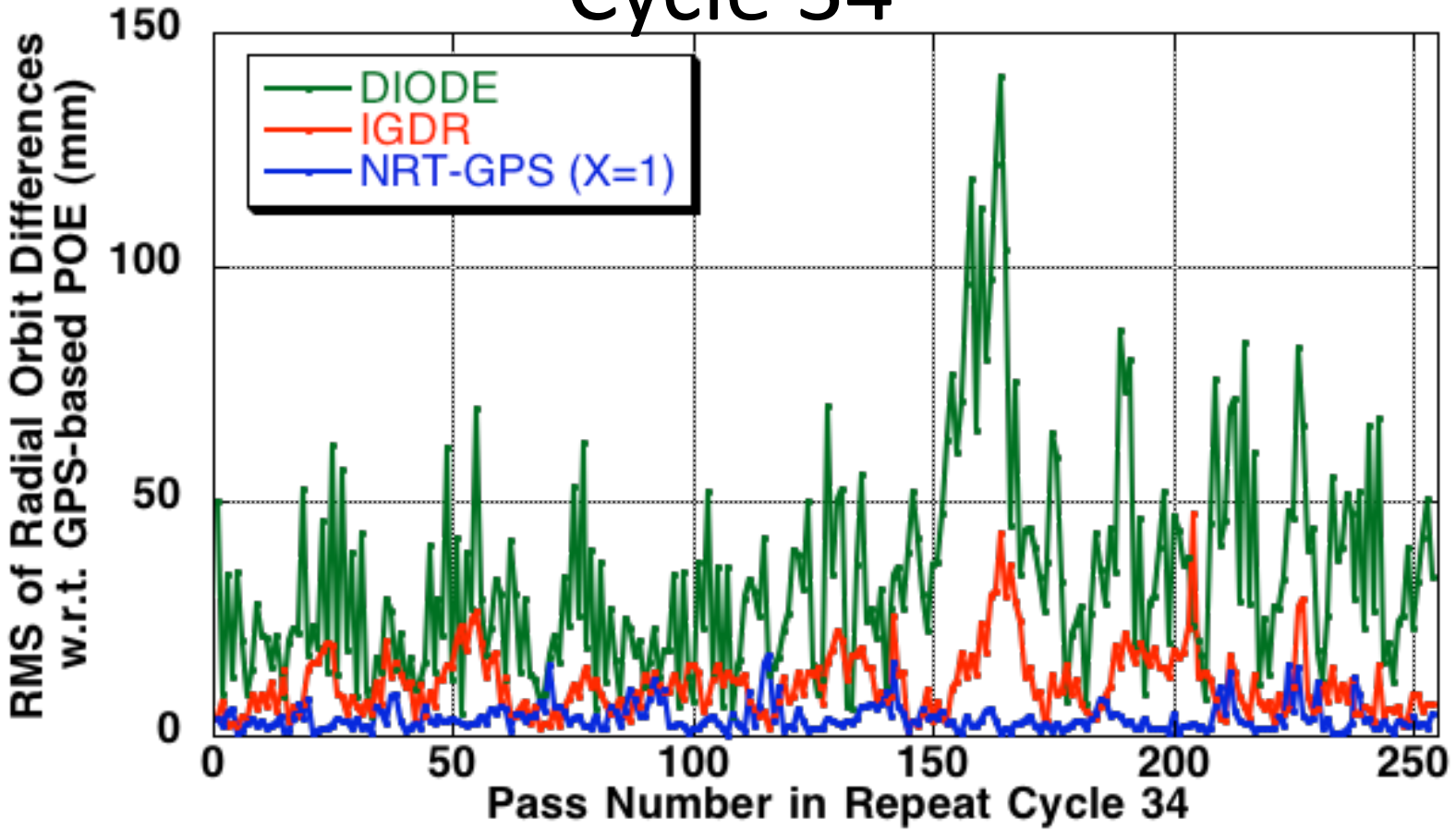


MAX = 0.324
RMS = 0.078

(Along-Track Mean = 0.074 m still under investigation)

Jayles, Chauveau, Chaillou

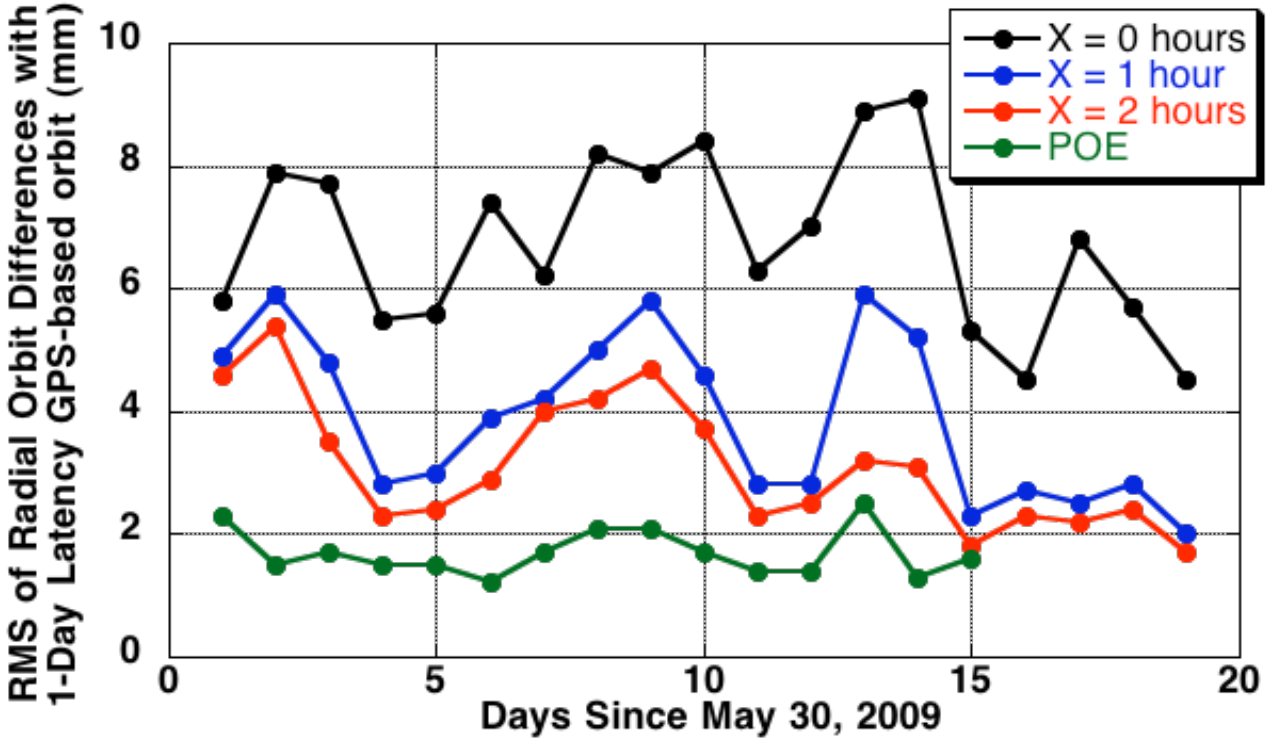
Orbit Differences with GPS-based POE: Cycle 34



- RMS of difference over complete cycle 34:
  - DIODE: 40.9 mm IGDR: 12.9 mm NRT-GPS: 4.8 mm

Desai, Bertiger, Haines, Harvey, Lane, Weiss

Orbit Differences with Next-Day Precise GPS-based Orbit



Average of Daily Radial RMS of Orbit Differences w.r.t. Next-day Orbit.

GPS-based Orbit	Average (mm)
NRT, X=0	6.8
NRT, X=1	3.9
NRT, X=2	3.1
GPS POE	1.7

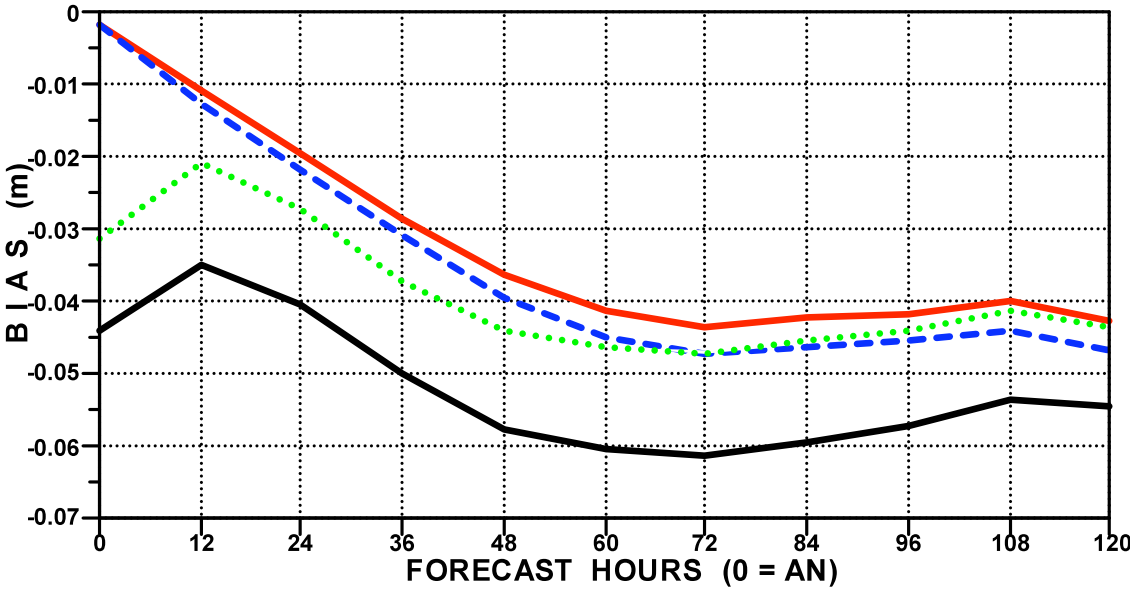
- GPS-based next-day and GPS-based POE agree to < 2 mm (RMS).
- 1 hour orbit cutoff requires latency of 1 OGDR lag, but provides significant (2.9 mm RMS) gain in radial orbit accuracy.
- 2 hour orbit cutoff provides additional 0.8 mm (RMS) improvement in radial orbit accuracy, but requires lag of 2 OGDRs.

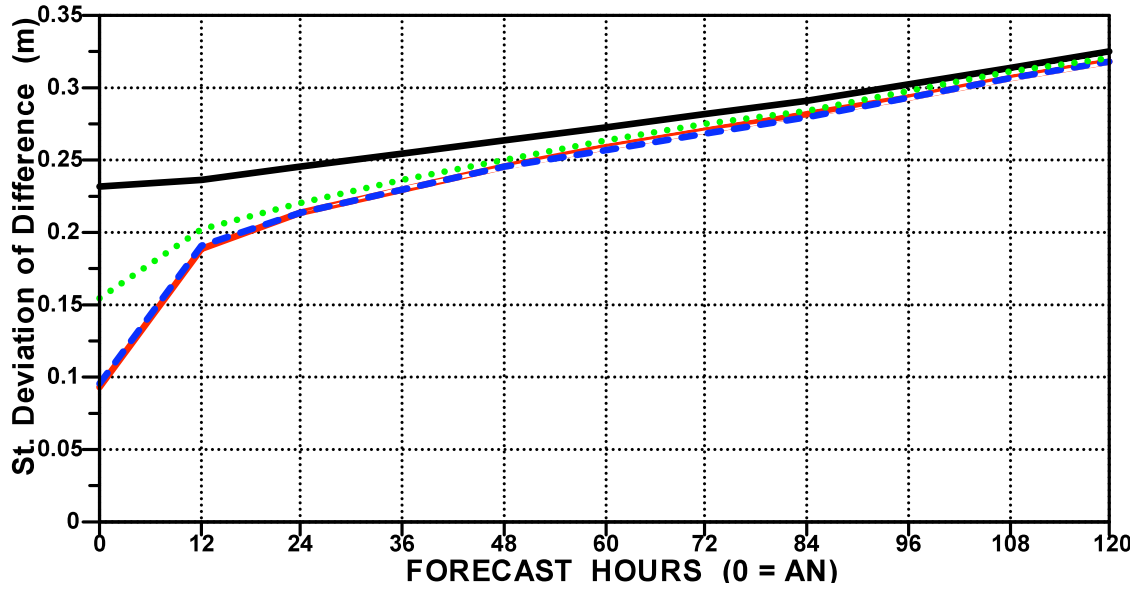
Desai, Bertiger, Haines, Harvey, Lane, Weiss

Impact of Jason-2 SWH assimilation on the model SWH forecast errors in the Tropics

Verified against Envisat & Jason-1

(From 01 August to 21 September 2008)



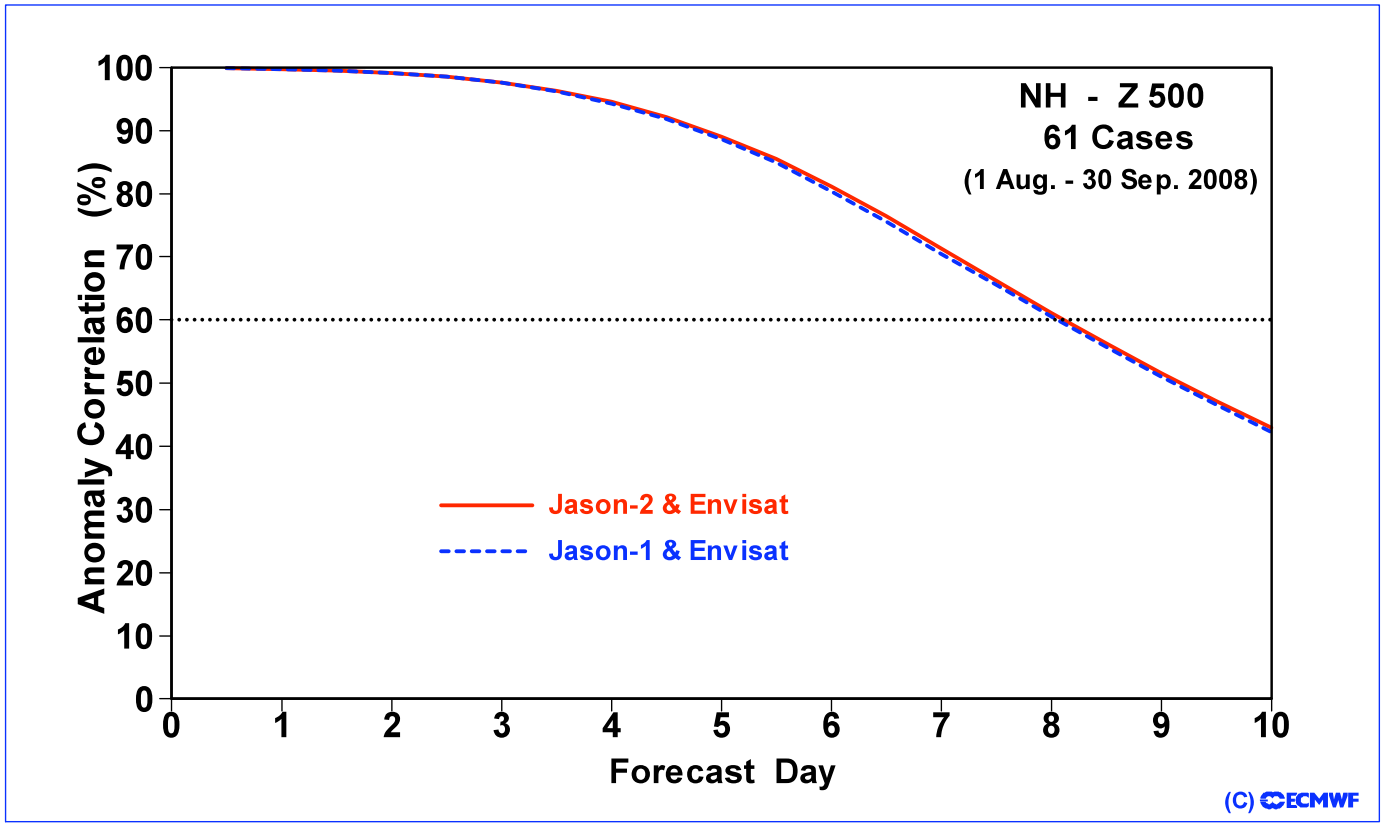


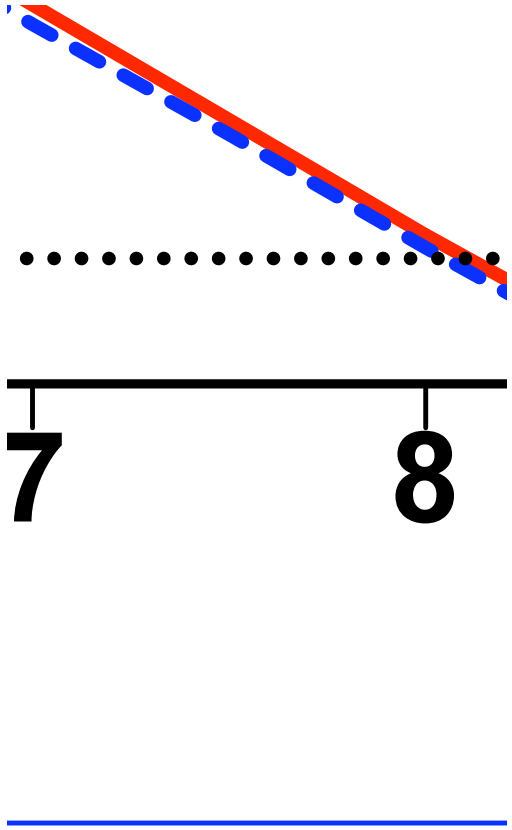
No data assim.
Jason-2 alone
Jason-2 & Envisat
Jason-1 & Envisat

Abdalla, Janssen Bidlot

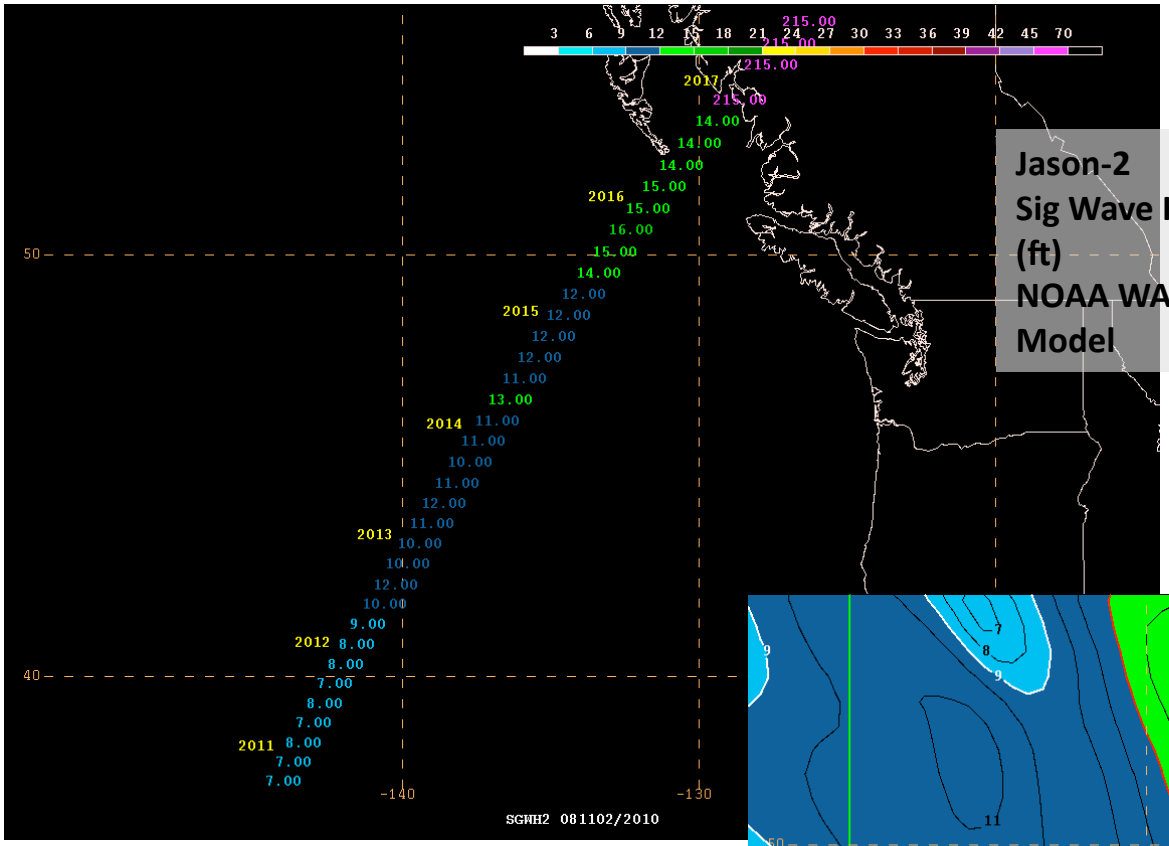
Impact of Jason-2 SWH assimilation on the model **500 hPa Geopotential Height** forecast errors in the Northern Hemisphere

(w.r.t. operational analysis, 1 August – 30 September 2008)



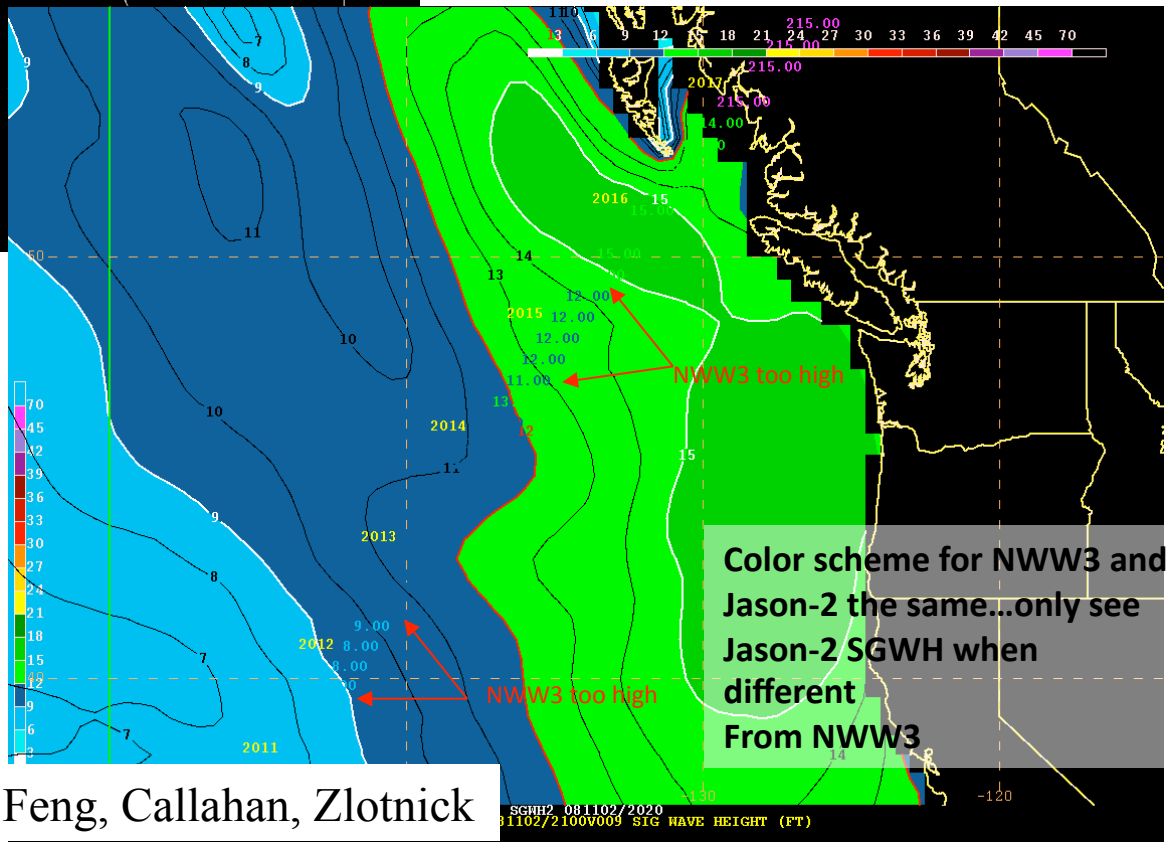


Abdalla, Janssen Bidlot



Jason-2
Sig Wave Height
(ft)
NOAA WAVEWATCH III
Model

- Diagnostic
  - Compare to NWW3
  - Forecasters adjust forecasts
  - Evidence of localized events
    - **Gulf Stream**
    - **Cape Farewell**
    - **Cape Mendocino, CA**
    - **Gulf of Tehuantepec**

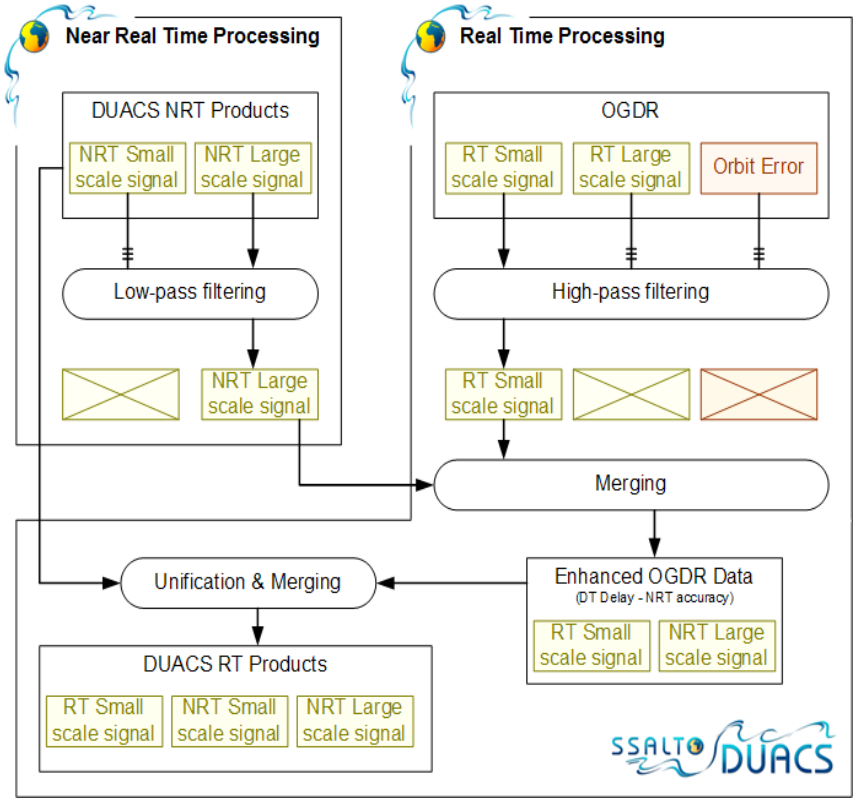


Color scheme for NWW3 and Jason-2 the same…only see Jason-2 SGWH when different From NWW3

Chawla, Sienkiewicz, Ji, Vandemark, Feng, Callahan, Zlotnick

Processing overview

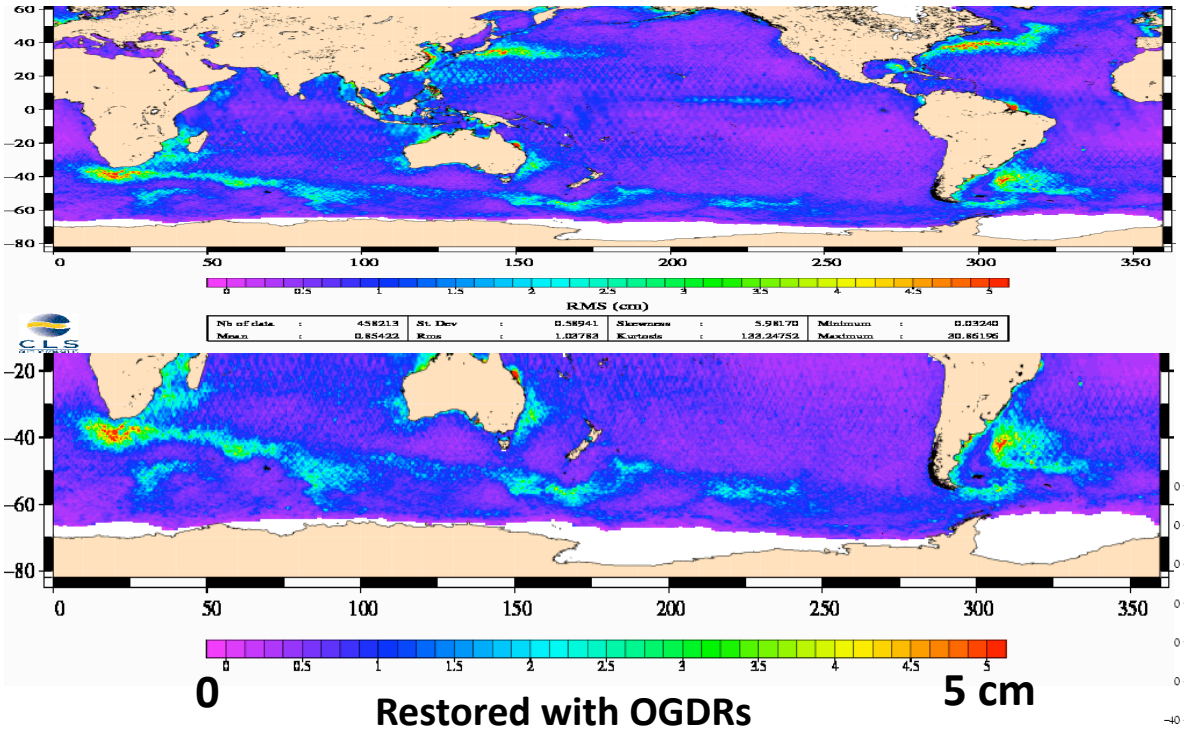
- OGDRs were not used in DUACS until 2007 : fast delivery error budget = deal-breaker
- The main error of OGDR is associated to orbit determination → very large scale error
- Rationale :
  - Assumption : large scale content is relatively stationary over 48h (and captured by IGDR maps)
  - Use small scale content from OGDR as an innovation to the latest multi-satellite IGDR map
  - Whenever a new IGDR flow arrives, the OGDR equivalent is removed
  - Update external corrections whenever relevant and possible (JA1 wet tropo, envisat orbit…)
  - Specific OGDR tuning of DUACS processing steps
- Two DUACS productions run every day
  - Nominal (operational): IGDR only
  - Experimental (best effort) : IGDR+ 2d of OGDR
  - Same analysis date (Production day – 6)
  - 1.5 year of daily IGDR+OGDR maps are now available



Dibarboure, Pujol, Pascual, Bronner

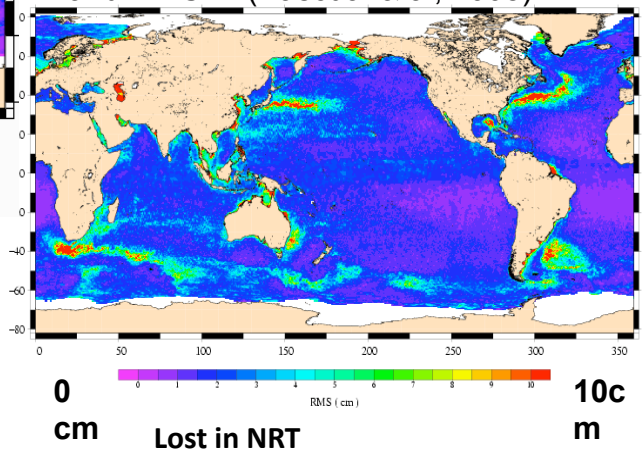
Impact on actual operational products

RMS of the differences between traditional NRT SLA (IGDR only) and combined NRT+RT SLA (IGDR+OGDR) for 2 satellites



- Variability "lost" in NRT is partially restored with OGDRs
- OGDR data have a significant impact on areas with important spatial & temporal variability

RMS of the differences between NRT and DT SLA (Pascual & al, 2008)

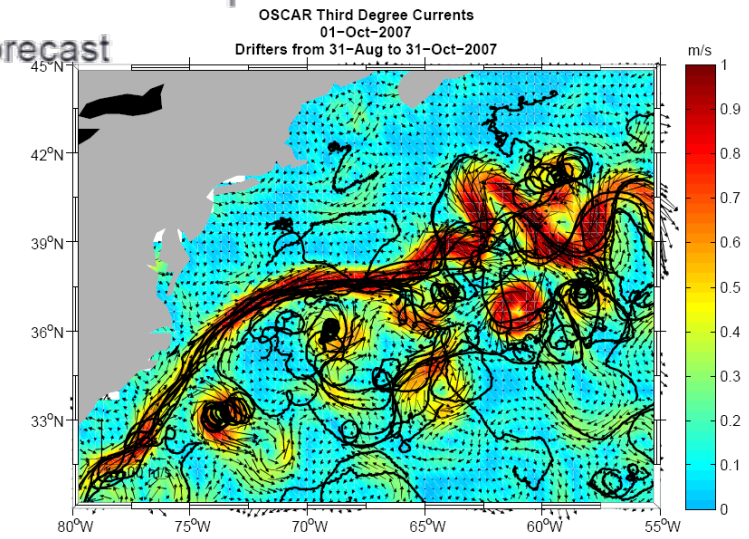


- RMS of the differences between classical IGDR-based and experimental IGDR+OGDR-based products is equal to ~40% of the difference between offline (DT) and NRT products

Dibarboure, Pujol, Pascual, Bronner

Assessment of near real-time OSCAR surface currents

- DT and NRT-based currents are very similar and compare better with drifters than NRL-based currents
  - lower NRL amplitudes with more spread and lower correlations.
- All OSCAR surface currents (DT,NRT,NRL) compare well with drifter velocities in regions of strong SSH gradients: boundary currents and zonal equatorial component.
- Amplitudes are underestimated outside the above regions, with lower velocity correlations.
- Future Directions
  - Improve the wind-driven turbulent mixing scheme
  - Incorporate faster timescales in wind driven OSCAR component
  - Extend OSCAR capability to nowcast and forecast



Currents are interpolated onto the drifter locations (which have been averaged over 1 day). Zonal and meridional currents *vs* drifter velocities.

Dohan, Gunn, Lagerloef, Mitchum

Conclusions:

- Jason-2 OGDR meets or exceeds expectations for NPOESS accuracy, precision and latency requirements
- Smaller problems in all products need to be considered before final GDR release (see Lingering Issues on slide #3)
- Upload new v4.01 navigation DIODE software
- GPS-based NRT-POD for OSTM/Jason-2 demonstrating < 1 cm (RMS) radial orbit accuracy (operational centers requesting inclusion in operational products)
- Jason-2 OGDR has positive impact on SWH forecast and meteorological forecast accuracy
- Jason-2 OGDR is used operationally by marine forecasters for ship warnings by evaluating both model forecasts and altimeter SWH
- The improvement observed in actual products (consistency with offline maps) is consistent with predictions from simulations (OGDR error budget reasonably controlled)
- OSCAR is moving analysis forward in time with more timely data & higher spatial resolution

Near Real Time Splinter Summary

- Jason-2 OGDR products are presently used in operational centers
- Performance improvements in data stream and center products are demonstrated
- Continued demand for further development