Near Real-Time Jason-2 Product Operations

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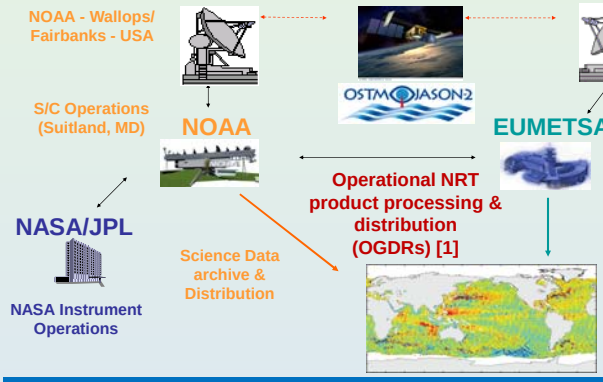
Abstract

In partnership with CNES and NASA, NOAA and EUMETSAT have joint responsibility to process and disseminate the Near Real-Time (NRT) Jason-2 products [1]. Several activities are entailed in NRT product operations, including processing, dissemination, data quality monitoring and user service notifications. An important input to the processing, under the responsibility of EUMETSAT, is the operational provision of meteorological path delay corrections based on the ECMWF Numerical Weather Prediction (NWP) model.

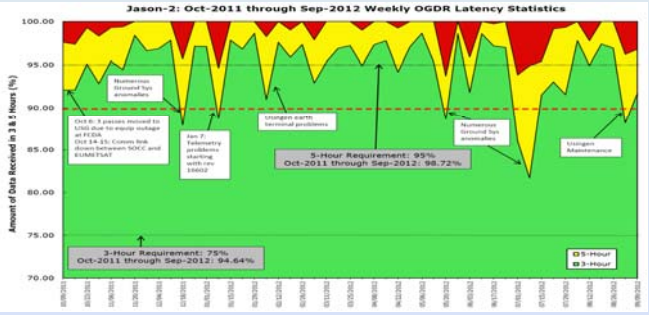
This poster provides an overview of the activities associated with the day-to-day operations, including coordination of routine activities and end-to-end monitoring. With respect to product quality, the functionality and recent enhancements of the JPL/NOAA Near Real Time Altimeter Validation System (NRTAVS) tool are reviewed, and examples of its use in routine operations are provided.

The system that provides operational ECMWF files to the Jason-2 ground segment will be discussed, focusing on recent improvements with a summary and outlook of the main changes. The latter are driven by evolutions in the ECMWF model (with various degrees of impact) such as updates of the model physics, changes in data format, and changes in horizontal or vertical grid resolution.

Jason-2/OSTM – a successful partnership



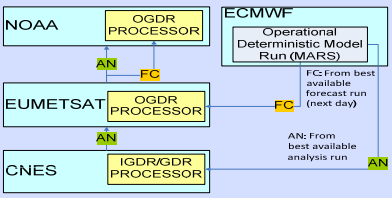
Timeliness is important!



OGDR timeliness statistics monitored w.r.t mission requirements, and also routinely file by file and step by step in the data flow

(EXAMPLE) Day	AOS	LOS	Sat	Station	PLTM1 timeliness	OGDR timeliness	GTS timeliness	EUMETCast timeliness
12/08/30 243	07:32	07:54	Jason-2	NOAA	00:04:00	00:17:47	00:20:58	00:31:04
12/08/30 243	09:28	09:46	Jason-2	NOAA	00:04:41	00:20:45	00:21:35	00:37:55
12/08/30 243	10:59	11:17	Jason-2	SUSG01	00:00:11	00:11:38	00:12:56	00:27:18
12/08/30 243	12:52	13:13	Jason-2	SUSG01	00:00:48	00:15:07	00:16:22	00:30:42

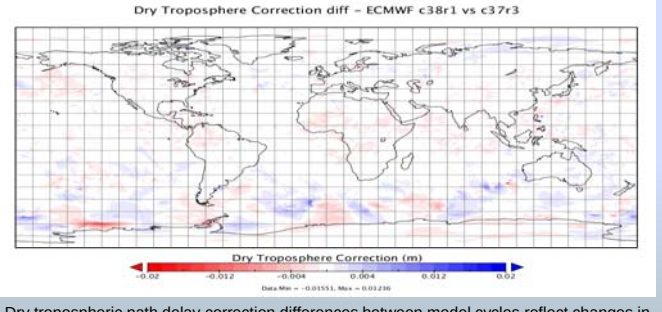
The MetScript



Meteorological path delay corrections are generated daily from the ECMWF operational atmospheric deterministic model runs (analysis and forecasts). The input model parameters are extracted from the Meteorological and Archival Retrieval System (MARS) and processed by the MetScript.

Input (MARS parameter)	Derived parameters
specific humidity (q)	wet tropospheric correction
Temperature (t)	dry tropospheric correction
2 m temperature (2t)	mean surface pressure
2 m dew-point temperature (2d)	corrected surface pressure
surface pressure (sp)	
10 m U-wind component (10u)	Used in the
10 m V-wind component (10v)	O/I/GDR Processing
mean sea level pressure (msl)	

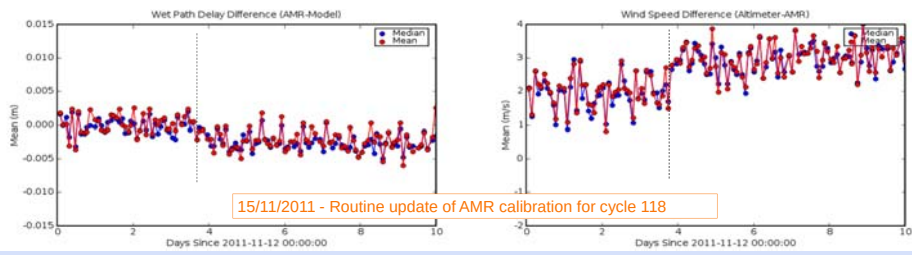
Impacts of ECMWF model cycle evolutions on the path delay corrections are checked in advance. Some require further updates in the MetScript code, such as the model horizontal resolution change (Jan 2010) or the coming vertical resolution change (expected in 2013).

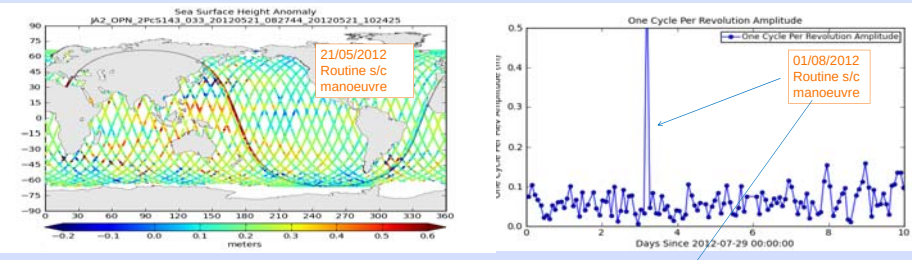


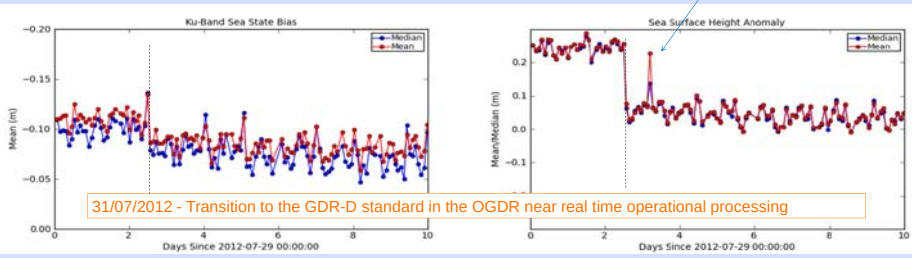
Dry tropospheric path delay correction differences between model cycles reflect changes in the ECMWF model surface pressure field

Detecting and monitoring changes with NRTAVS

NRTAVS is run at NOAA and EUMETSAT in the operational ground segment, in order to detect in near real time changes affecting the product quality. Time series of orbit statistics are plotted for the main geophysical parameters and thresholds are set for their expected variations. The system is data-driven and is used by shift ground segment controllers to identify problems in near real time. An e-mail notification for product experts and engineers is sent, in case of violations of established thresholds or on late products, as well as generation of reports that allow for review of the operations in a longer time frame than the day to day work. Some examples below:





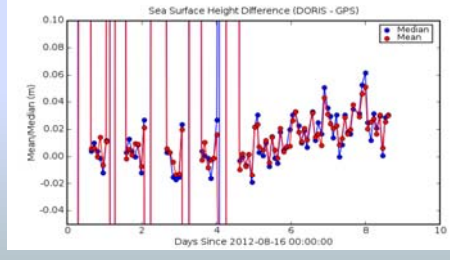


Continuous development and learning

As discussed in this poster, an important part of Near Real-Time operations is about continuous improvement of the product quality and also about learning about our space systems and their evolution in time. The improvements of the path delay corrections, the implementation of the GDR-D standard in operations and the AMR calibrations are examples of that, and the NRTAVS tool provides an excellent way of assessing those in an automatic way in near real-time.

As an additional tool, an independent Jason-2 GPS-based near real-time Precise Orbit Determination (POD) has been implemented experimentally at EUMETSAT, capitalising on the POD capability and expertise in the context of the METOP program [2]. This POD is also monitored with NRTAVS and currently being used to assess in near real-time the OGDR orbit quality. For example, it allowed to identify a problem in the implementation of the July 2012 leap second.

NRTAVS, the MetScript and a GPS-based near real-time POD are fundamental for operational processing and monitoring of the OGDR quality. We will continue developing them to adapt to coming operational altimetry missions, such as SARAL, Jason-3, Jason-CS and Sentinel-3.



References and further information

[1] OSTM/Jason-2 Handbook at www.class.ncdc.noaa.gov/release/data_available/jason/userhandbook.pdf, www.eumetsat.int/groups/ops/documents/document/pdf_jason2_products_handbook.pdf

[2] Andres, Y. et al. - Jason-2 GPS-based OGDR products, Poster to the OSTST 2012

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