

## SARAL Version 'T' patch 2 Geophysical Data Records: Public Release

Dear Altimetry Data Users,

As one of major outcome of the first SARAL/AltiKa verification workshop in August 2013, the "patch 2" has been prepared to improve the data quality. The evolutions included in this patch are summarized below and the main impacts on ocean sea surface height are detailed in next pages. This calVal analysis was performed on CNES and CLS side using classical tools like Cross-Overs and SLA analysis. This memo provides early metrics computed on our side in order to ease the SARAL Patch 2 use. This is based on the analysis of GDR data dated from mid-March 2013 to beginning of October (cycles 1 to 6). The Patch 2 evolutions have been analyzed thanks to a SARAL dedicated prototype (PEACHI). The Calval analysis will continue with the routine monitoring of OGDRs, IGDRs and GDRs products.

Patch 2 includes the following evolutions:

- **Wind look-up table:** The table provided by NOAA is used. This table is only based on the measured sigma0, taking into account the atmospheric attenuation (sigma0 at the surface).  
(Reference: *John Lillibridge and co [2013] - One and Two-Dimensional Wind Speed Models for Ka-band Altimetry - JTECH-D-13-00167.1*)
- **SSB look-up table:** The table provided by R. Scharroo is used. We use only the significant wave height to compute the SSB.
- **Radiometer neural algorithm:** Taking into account several months of AltiKa measurements, the neural network coefficients have been updated.
- **Ice-2 retracking algorithm:** The algorithm has been updated taking into account the AltiKa Ka band specificities (ice2 algorithm was based on ENVISAT Ku band experience).
- **FES2012 tide model:** This new tide model is included, improving the SSH accuracy in coastal zones. (Reference : <http://www.aviso.oceanobs.com/en/data/products/auxiliary-products/global-tide-fes2004-fes99/description-fes2012.html>)
- **Matching pursuit algorithm:** the algorithm based on J. Tournadre proposal has been tuned to comply to AltiKa Ka band specificities.
- **MQE parameter scale factor:** the scale factor of the MQE has been modified.
- **Update of the altimeter characterization file:** The altimeter characterization file has been modified in order to account for 63 values of altimeter gain control loop (AGC). This has impacts over sea ice and land hydrology, in some cases the AGC was set to default value in current P1 products.
- **Doris on ground processing (Triode):** The Doris navigator ground processing has been upgraded to reduce the periodic signal observed on the altitude differences with MOE/POE.

This patch will be installed on IGDRs products around January 21st. And it will be installed on OGDRs processing chains (at EUMETSAT) around February 5th. **We will provide the actual installation dates and the name of 1<sup>st</sup> products generated with Patch 2 as soon as possible.**

Regarding the GDRs products, all the cycles will be reprocessed with the patch 2. As a consequence, the cycles 1 to 7 already disseminated (and generated with the patch 1) can be found on the AVISO ftp server in the directories named gdr\_t\_old / sgdr\_t\_old / ssha\_gdr\_t\_old. The patch 2 products will be circulated on the gdr\_t / sgdr\_t / ssha\_gdr\_t directories.

Best Regards,

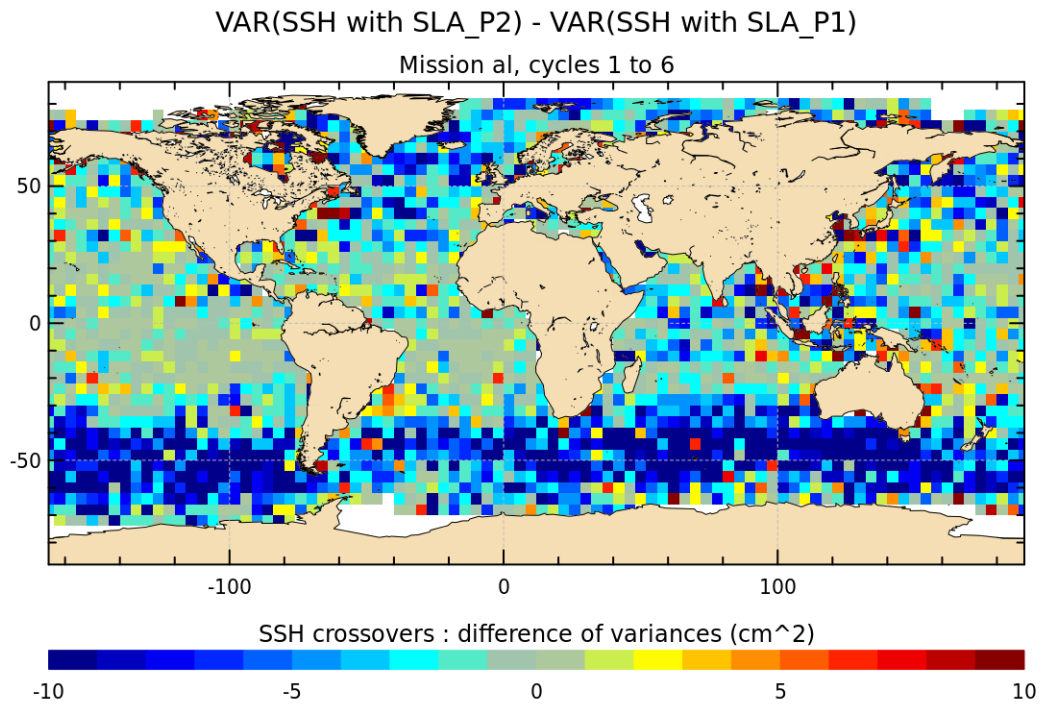
On behalf of CNES SARAL project,  
Nicolas Picot - CNES Measurement System Engineer  
Amandine Guillot - SARAL CalVal Responsible

## SARAL GDR-T "patch 2" early CalVal analysis

### Mono mission crossover performances:

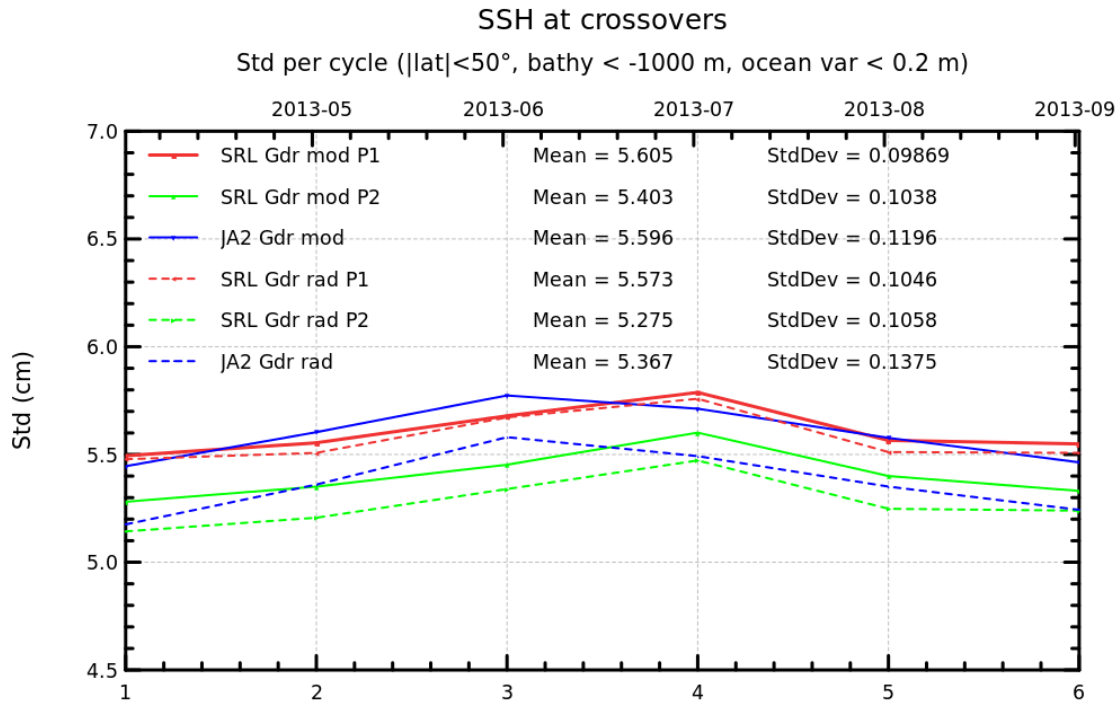
The blue color corresponds to a decreased variance at crossovers (improvement) with the patch 2. The variance reduction can be noted especially in regions with high SWH (around 50 S), but also in high latitudes of north Hemisphere.

Note that Crossovers are only selected for open ocean (latitude less than 50°, bathymetry less than -1000 m and oceanic variability less than 20 cm).



*CrossOver mean differences for SARAL patch 1 and patch 2 over the same period.*

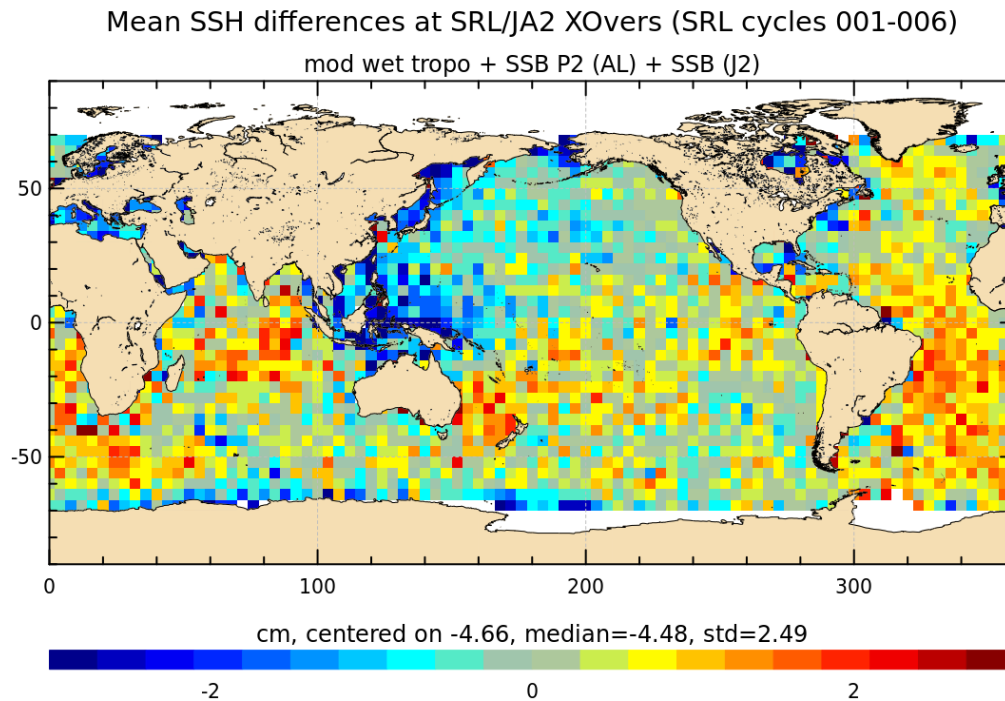
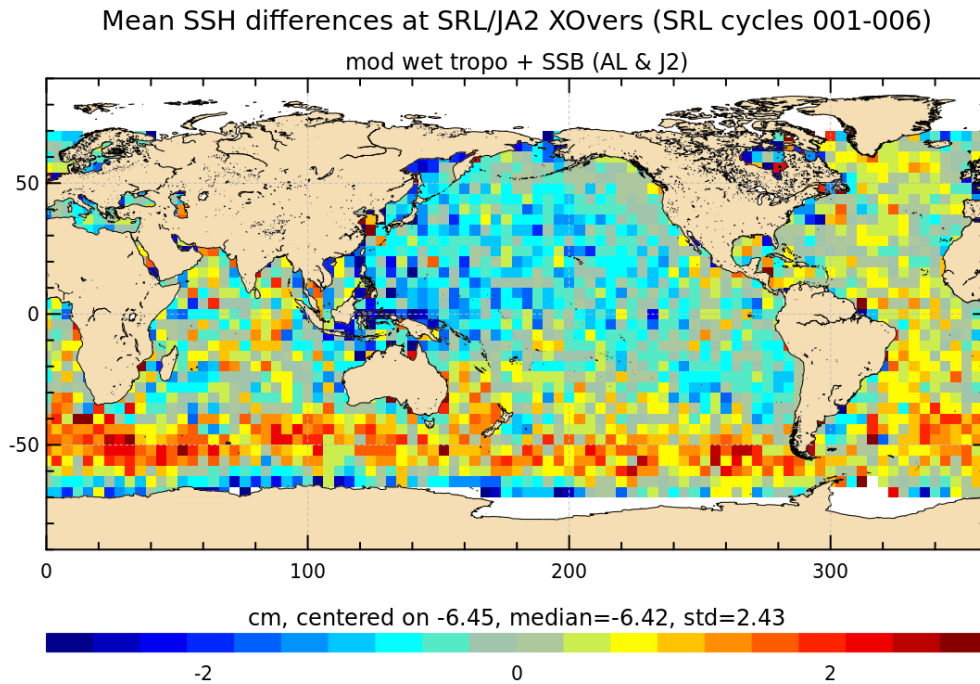
The improvement of Xover quality is evidenced on the figure below. The Xover rms goes down to 5.27 cms with the radiometer wet tropospheric correction – slightly below the Jason-2 figure (5.36 cms). The radiometer wet tropospheric correction improvement can also be observed on the below figure (dashed green curve compare to the green curve).



*Standard deviation of cross-over differences for SARAL and Jason-2.*

### **Multi mission crossover performances:**

On the two following maps one can see the impact of the new SSB solution implemented in the patch 2. The SARAL/Jason-2 crossover mean difference is reduced from 6.45cm to 4.66cm and the differences located in high SWH areas are reduced. New geographically correlated patterns appear on this map, this will be analysed further with more cycles.



### **SLA performances:**

The following map shows the impact of the patch 2 on the SARAL/AltiKa SLA, with respect to the SARAL/AltiKa SLA calculated with the patch 1. The global mean of SLA increases with the patch 2, except around Indonesia and in the Gulf of Mexico.

