

Envisat ocean altimetry reprocessed GDR V3.0 soon available!

Ghita JETTOU, Annabelle OLLIVIER and Stéphanie URIEN (CLS), Françoise BAILLY-POIREAU and Thierry GUINLE (CNES), Pierre FÉMÉNIAS (ESA)

In 2012, ENVISAT mission was interrupted, after 10 years of altimetric measurements over ocean. Five years later, the mission's dataset is still maintained. Used as a reference for the expected behavior of very young or future missions, the historical dataset still evolves.

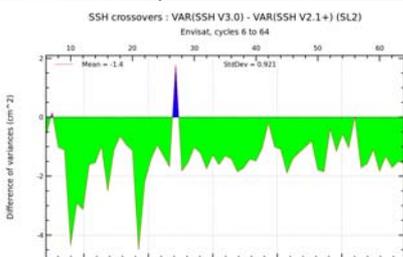
The second altimeter dataset reprocessing is close to completion with a tenth of algorithm improvements. The major evolutions are listed below with an overview on the expected effects at different scales.

List of Upgrades and expected improvements scales

Upgraded Fields	Orbit GDR-E standards	MWR wet tropospheric correction	MWR derived fields (ice flags, atmospheric attenuation...) will also be upgraded	SSB computed with all upgraded corrections	PTR Internal Path Delay drift	Look Up Tables for small waves correction	L1b reprocessing: ICU, USO, IF mask...	Ocean Tide: MAR_GOT_4V10 FES_2014B	Non equilibrium long period ocean tide	Updated MSS (CNES/CLS 2015)	New iono. filtering method
Expected impact	Climate scales geographical variations Short scales error reduction (crossovers)	Coastal areas Short scales error reduction (crossovers) Reduction of difference with model	Mesoscale	Mesoscale	Climate scale	Reduction of altimetry/ER A-Interim model dependency for Envisat small waves.	Negligible effects	Mesoscale	Mesoscale	Regional scale	Number of SLA valid data increase. Short scales error reduction (crossovers) Independent from editing step

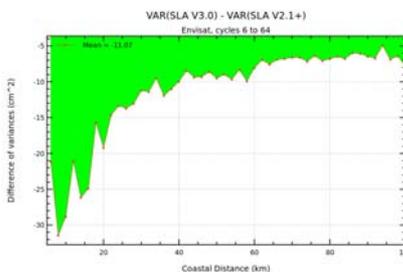
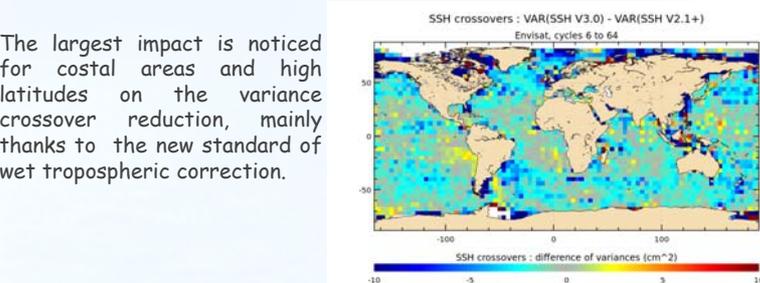
Short scales error reduction: SSH variance at crossovers

SSH variance at crossovers decrease shows the impact of V3.0 new standards compared to the V2.1+ dataset.



The variance gain of SSH at crossover is around 1.4 cm² and can locally reach above 4 cm².

The largest impact is noticed for coastal areas and high latitudes on the variance crossover reduction, mainly thanks to the new standard of wet tropospheric correction.



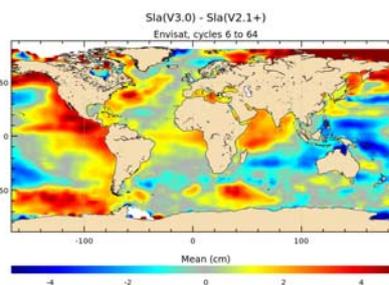
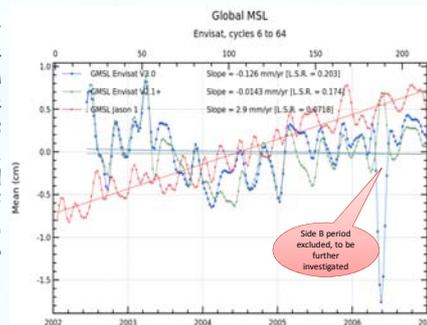
SLA's standard deviation decrease near coasts highlights a reduction of noise that is mostly due to radiometer improvements and ocean tide upgrades in these coastal areas.

Climatic scales error reduction: impact of MSL trends

Global MSL evolution compared to V2.1+ dataset : monitoring

The largest impact on regional MSL trend estimation is due to the orbit solution upgrade, mostly thanks to the improvement of gravity field. The largest impact on global MSL trend estimation is due to L1b range upgrade, mostly thanks to PTR correction, now directly applied to the range. The external correction previously available is no longer necessary.

Preliminary metrics computed on the first five years enables to confirm the weak impact of the reprocessing over Envisat's global mean sea level. Further comparisons and geographical analysis of regional MSL will enable to precise this impact later on.



The global impact of the V3.0 reprocessing on regional bias is shown on this plot. It highlights different structures which patterns are dominated by the impact of the radiometer, SSB, orbit and tides improvements. The impact of L1b evolutions alone (including all retracked data) is very weak.

Schedule and data availability



Conclusion

This preliminary analysis focusing on the first five years of Envisat's reprocessed data shows a much better capacity to describe mesoscale phenomena (reduction of error at crossovers). These improvements are mainly due to geophysical corrections evolutions which are an inheritance of multi-mission corrections improvements (MSS, Tides...) and are also due to a better understanding of some instrumental processing, thanks to studies performed on recent missions (Altika, S3...).

A more complete analysis will be distributed in a dedicated report, at the end of the validation process, jointly with the data.

- The future V3.0 dataset will be freely available online upon registration via ESA Earth Online/My Earthnet (<https://earth.esa.int>) for the 1st quarter of 2018

- For any queries please contact ESA EOHelp / eohelp@esa.int (<https://earth.esa.int/web/guest/contact-us>)

Thanks to CORPUS project (CNES), 1 year of GDR could be reprocessed within 2.5 days instead of the previous 20 days.