Towards Regional Products

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Abstract

Ssalto/Duacs system processes data from all altimeter missions to provide a consistent and homogeneous catalogue of products for varied applications, both for near real time applications and offline studies in the framework of the SALP/CNES and MyOcean/SL TAC project.

We present here a focus on the latest updates of the SSALTO/DUACS production : new regional products and improved data processing.

Europe product

L3 available since December 2011

Specificities of the product :

- o SLA corrections are based on the same standards as used for global processing.
- o L3 along-track data are optimally filtered (Lanczos) in the area to better reduce measurement noises (Fig 5).
- o L3 product is delivered with a full 1Hz (~7 km) sampling.

➔ The Europe product resolves smaller structures than the Global product

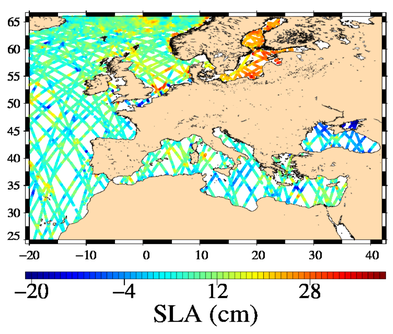


Fig 4 : Example of Jason1, Jason2 and Envisat data over the Europe area (5 days of data)

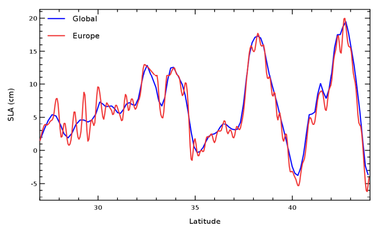
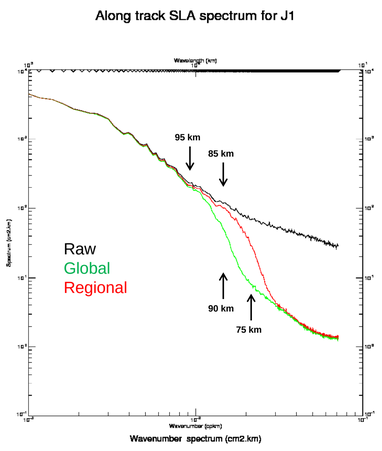


Fig 5b : Example of Jason2 along-track data (track 148) for global and Europe products.

Fig 5a : Power spectrum of Jason-1 data over the Europe area and for year 2008. Filtering applied for regional processing allows to better resolve short wavelengths. 95 to 85 km wavelengths, are present in the regional product whereas near absent in the global product.



Mediterranean and Black Sea

The Mediterranean Sea and the Black Sea products are still processed by the Ssalto/Duacs system. Along-track data, as well as gridded products are delivered both in delayed time and near real time conditions.

Specificities of the products:

- o SLA corrections are based on the same standards as used for global processing.
- o L3 along-track data are optimally filtered to better reduce measurement noises and restore as much as possible shorter wavelengths.
- o L3 product is delivered with 0.5Hz (~14km) resolution in the Mediterranean and 1Hz (~7 km) in the Black Sea.
- o L4 gridded products are generated with 1/8°x1/8° spatial resolution, using correlation scales better fitted to the characteristics of the signal in the area

Experimental Kerguelen product

Regional products are also implemented as experimental datasets. It is the case of Kerguelen products, implemented with a specific support from CNES, in support of the KEOPS2 oceanic campaign.

See the dedicated poster for more information.

Arctic product

L3 available since December 2011

Specificities of the product :

- o Mainly based on Cryosat2for latitudes > 66°N (Fig 1)
- o TPXO7.2 [1] tidal correction is applied, instead of GOT4.8 as for global product. This allows a significant reduction of the errors in the Arctic Ocean (North of Polar Circle) (Fig 2)
- o Mean Sea Surface DTU 2010 [2] is used instead of MSS CNES/CLS 2011. This allows improved performances, in a large part of the Arctic Ocean, in summer with the minimum of ice coverage (Fig 3).
- o L3 along-track data are optimally filtered (Lanczos) in the area to better reduce measurement noises. Signal wavelengths until 85 km are present in the regional L3 product , when main part of 95 to 85 km wavelength are absent in the global product.
- o L3 product is delivered with a 14 km sampling.

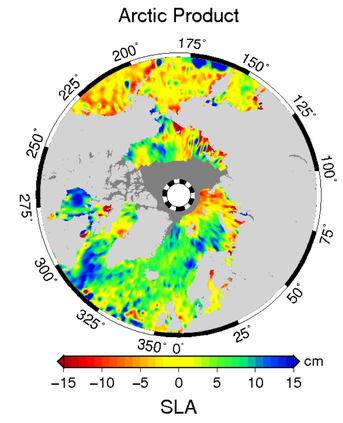


Fig 1; Example of SLA observed in late August 2012 in the Arctic Ocean.
In summer 2012, the reduction of ice coverage is exceptional. Thanks to Cryosat-2, we are able to observe the Arctic sea surface up to 86°N!

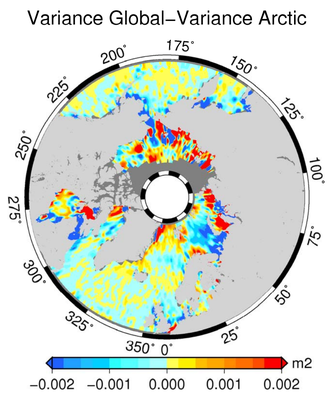


Fig 2 : Map of variance differences of SLA from global and regional products. Positive values traduce the improved quality of the regional product. It is mainly induced by the different tide correction used for global and regional products. Oceanic tide derived from TPXO7.2 (GOT4.7) is used in the regional (global) processing. TPXO performances are improved by the use of tide gauges in the high-latitude areas.

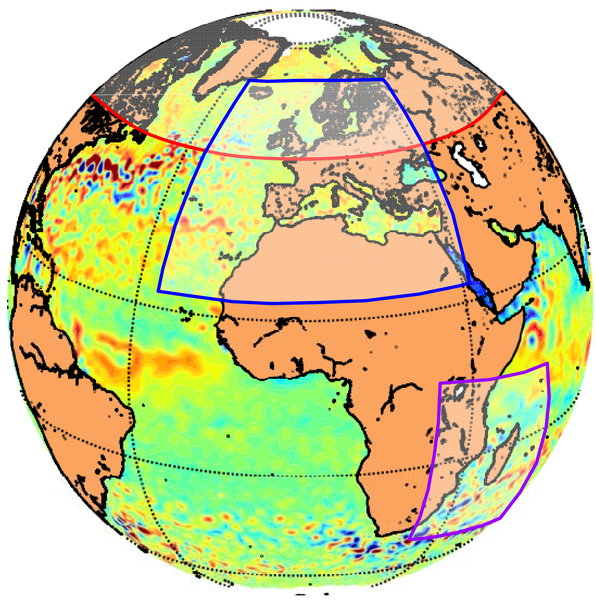
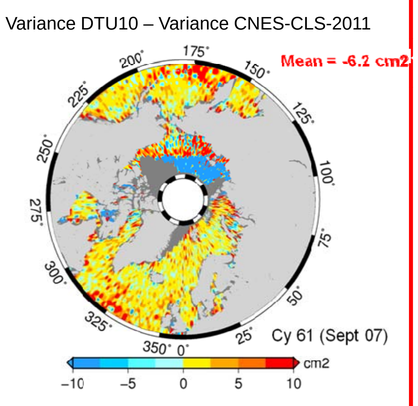


Fig 3a : Difference of variance of SLA with MSS DTU10 (referenced to the 7 years 1993-99) and MSS CNES/CLS 11 over Envisat cycle 61 in September 2007. Negative values traduce a reduced variance when MSS DTU10 is used. It is considered as an improvement, associated with the fact that MSS CNES/CLS 2011 is mainly based on Geoid value in the areas concerned. The improvement is associated with a minimum of ice coverage and vary with time according to the ocean surface free of ice (Fig2b)



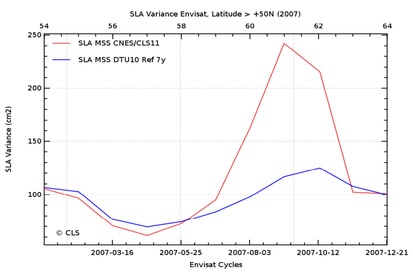


Fig 3b: Envisat SLA variance (2007) with selection on latitudes > 50°N with MSS CNES/CLS 11 and DTU 10 referenced over the same period of 7 years.

Mozambique product

L3 and L4 available since March 2011

Specificities of the product:

- o SLA corrections are based on the same standards as used for global processing.
- o L3 along-track data are optimally filtered (Lanczos) in the area to better reduce measurement noises and restore as much as possible shorter wavelengths.
- o L3 product is delivered with 0.5Hz (~14km) resolution.
- o L4 Gridded product are generated with 1/8°x1/8° spatial resolution, using correlation scales fitted to the characteristics of the signal in the area. It allows to better reproduce mesoscale activity in the area (Fig 6 and 7).

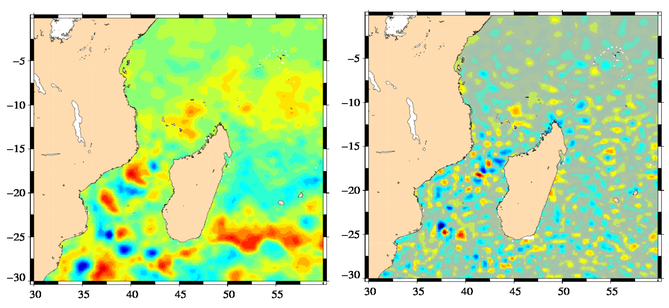
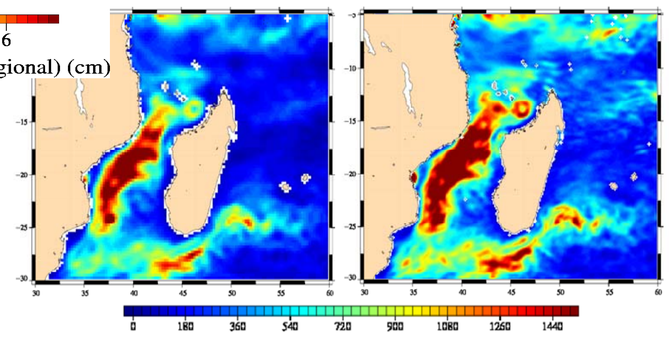


Fig 6 : Example MSLA product for Mozambique area (left) (map of day 05/10/2011) and differences with global product (right)

Fig 7 : Example of EKE (cm²/s²) observed with global product (left) and regional product (right) over year 2009. Higher EKE level in the regional product underlines the signature of mesoscale activity better reproduced with this product.



[1] Egbert et al., 2002; see http://volkov.oce.orst.edu/tides/global.html
[2] Andersen O. B.,T. Bondo, P. Knudsen and P. Berry. ESA Living Planet Symposium, Bergen, 2010. Poster « The Mean Sea Surface DTU10; Comparison with GPS and tide gauges »

More information on the AVISO website
www.aviso.oceanobs.com
www.cls.fr/duacs (mirror)