SSALTO/DUACS: THE REPROCESSING OF THE 20 YEARS OF DATA IS ON GOING

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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 **recent and future improvements of the SSALTO/DUACS production.** They concern the coming data reprocessing as well as the NRT production.

More precise MSL

Using improved altimeter standards and inter-calibration processing significantly impact the restitution of the MSL trends:

✓Anomalies observed in 1994 on the current dataset is corrected

✓The regional MSL trend is improved

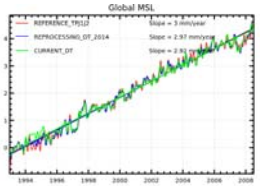


Fig: Global MSL trend computed from current "UPD" products, reprocessed products and reference along-track TP/J1/J2.

➔ Anomalies observed in the current version of the gridded products are corrected in the future version.

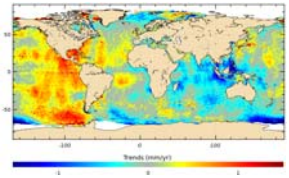


Fig: Regional MSL trend differences between the current "UPD" gridded product and the future version (period [1993,2009])

➔ Geographically correlated signature of the improved orbits solution used in the future products.

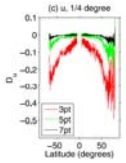
Geostrophic currents improved

✓ The use of the 9-point stencil width method (Arbic et al, 2012) allows to reduce the impact of the anisotropy introduced by the Cartesian ¼° grid resolution.

✓ The SLA computation in the equatorial band is improved in order to smooth the transition at ±5°N and improve the consistency between altimeter products and drifters observations.

Fig: Zonally averaged discrepancies between the V velocity component computed from 3-, 5- and 7-point stencils and those from 9-point stencils (from Arbic et al, 2012).

➔ The discrepancies, larger in high latitude areas in largely reduced when the stencil width is increased, with a convergence effect.



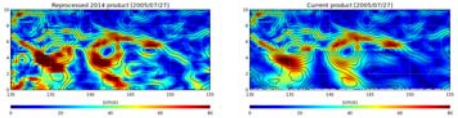


Fig: Geostrophic current intensity and SLA (black lines) on day 2005/07/27.

➔ The discontinuity of the current intensity observed at 5°N latitude in the current product is reduced in the reprocessed product. The intensity of the current in this last version in closest to the drifters observations.

Change of the reference period

The historical 7-year [1993, 1999] period historically used to reference the Ssalto/Duacs SLA products will be changed for the new 20-year [1993,2012] period. As a consequence the interannual signals will have more relevant intensities and spatial signatures.

Main Impacts of this change on the products:

✓ Different signature of the SLA at regional scale

✓ No change of the Absolute products (i.e. ADT)

More information in Aviso website, Newsletter #9 (may 2013)

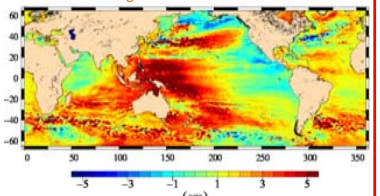


Fig : Corrective term to convert a 7-year referenced product to a 20-year reference.
The reference change will impact the mean of the SLA at regional scales

New absolute calibration of the SLA

SLA will be arbitrary calibrated so that the mean SLA is null aver 1993.

Main Impacts of this change on the products:

✓ **A near 2.5 cm global bias will be observed** between the current DT products and the future products

✓ The bias between DT and NRT products will be changed

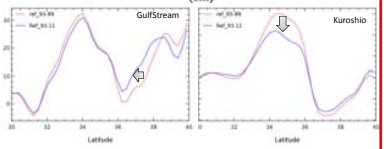


Fig: SLA along a meridional section crossing the GulfStream or the Kuroshio in December 2011. SLA referenced to the [1993, 1999] period (red) and [1993, 2011] period (blue).

➔ Changing the reference period can modify the SLA instantaneous signature of the specifics structures of the global surface circulation. It does not modify the Absolute Dynamic Topography.

Main important changes

▪ **New 20-year reference period**

▪ Use of **up-to-date standards** (GDR-D or equivalent) [1]:

– GDR-D products for Jason1/Jason2

– GDR-D orbit for Envisat

– GSFC orbits for Topex and GFO (except during maneuver periods)

– Reaper orbits foe ERS-1&2

– GOT4v8 tide solution for all missions

– New SSB solution from Tran 2012 for Jason-1&2, Envisat and Cryosat

– Reaper ionospheric solution for ERS1

– Dry troposphère from ERA-Interim for TP, ERS1&2; From ECMWF gaussian grids for Envisat.

– DAC solution computed from ERA-Interim for TP, ERS1&2; From ECMWF gaussian grids for Envisat.

▪ **Improved inter-calibration** :

– Bias from TP/Jason1 and Jason1/Jason2 were revised in order to correct geographical discrepancies affecting MSL observed with DUACS multi-mission MSLA.

– Biais observed in the current DT products for the non repetitive mission were corrected

▪SLA is computed with **MSS CNES-CLS-2011**. For repetitive orbits, cross-tracks gradients are improved using the **reference Mean profile updated** in order to take into account the new standards and to improve the quality near the coast. Extended temporal coverage offered by twin/triplet mission (TP/Jason1&2; TPN/Jason-1N and ERS/Envisat) was also exploited. The product are now referenced to the 20-year [1993-2012] mean, and **SLA was arbitrary calibrated so that mean SLA is null over 1993.**

▪ **Optimization of the optimal interpolation parameterization**.

▪ Computation of SLA maps with a daily resolution; spatial Cartesian 1/4° resolution for global and 1/8° for regional products.

▪ **More precise noise along-track filtering** (see poster "Reducing altimetry small-scales errors to access (sub)mesoscale dynamics: dream or reality?").

▪ **Improved algorithms for geostrophic velocities computation**.

▪ Use of the **new Mean Dynamic topography CNES-CLS-13** using the recent GOCE DIR-R4 mean field and improved processing method

▪ **changes of the nomenclatures and AVISO ftp directories**

Mesoscale better resolved

All the different changes implemented in the new version of the DT products lead to a more precise observation and reconstruction of the mesoscales structures.

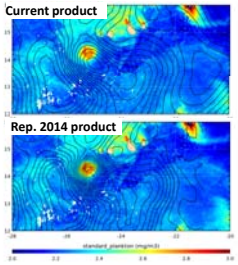


Fig: Chlorophyll concentration and SLA (black lines) on day 2011/11/20.

➔ The reduction of the correlation scales and along-track filtering, as well as the increased resolution of the gridded products (1/4° vs 1/3° Mercator for latitudes < ±45°N) lead to the improved reconstruction of the eddies. E.g. of an eddy underlined with chlorophyll concentration and better reconstructed in the reprocessed product .

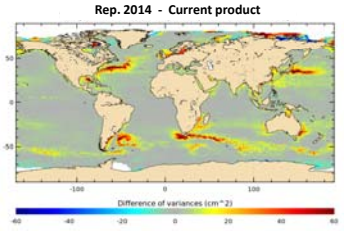


Fig: SLA variance differences between the current and reprocessed product (period [1993,2009]).

➔ The reduction of the correlation scales and along-track filtering, as well as the increased resolution of the gridded products (1/4° vs 1/3°) lead to the improved reconstruction of the SLA variability .

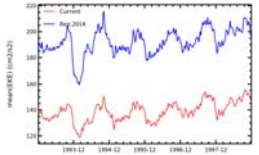


Fig: Mean EKE evolution for the current and reprocessed product (period [1993,2009]).

➔ The improved reconstruction of the surface structures and variability, as well as the improved methodology for geostrophic current computation (see dedicated §) lead to an increased EKE level in the reprocessed products.

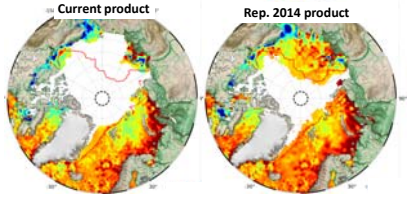


Fig: SLA Map and ice edge (red line) on day 2007/10/17.

➔ The high latitude spatial coverage is improved in the new version of the DT products .

In Summary

Early 2014 different changes will be included in the DT and NRT products and in a complete reprocessing of DT Products:

✓**Change of the reference period and absolute reference of the measurement**

✓**Improved standards and processing**

✓**New nomenclature and format**

➔**PLEASE SEND US YOUR FEEDBACKS!**
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