



Sea Level CCI project

Phase II 2nd annual review





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“Orbit error budget”

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WP 2830 “Improved estimation of the orbit-related radial orbit error budget over the first altimetry decade (1992-2002)”



Errors related to precise orbit determination (POD) are demonstrably one of the major error sources for global and regional sea level products (Ablain et al., 2015).

Over the second altimetry decade (2002-2013), Couhert et al. (2015) investigated the main contributions to the radial orbit error budget for the Jason series based on Geophysical Data Records (GDR)-D.

They found that:

- tracking data residual inconsistency can cause regional errors: up to 3-8 mm on the seasonal time scale, up to 3 mm/y on the inter-annual time scale and up to 2 mm/y on the decadal scale.
- reference frame errors can cause the following regional errors: up to 8 mm on the seasonal scale, up to 1 mm/y on the inter-annual scale and up to 0.3 mm/y on the decadal scale.
- Earth time variable gravity field errors can cause regional errors: up to 4 mm on the seasonal scale, up to 2 mm/y on the inter-annual scale and up to 1.5 mm/y on the decadal scale.



We have proposed a study on the improved estimation of the orbit-related radial orbit error budget over the first altimetry decade (1992-2002) due to following components:

- tracking data used for POD (by using various types of observations, for example, SLR-only observations versus SLR+DORIS observations);
- terrestrial reference frame (e.g. ITRF2008 (Altamimi et al., 2011) versus ITRF2005 (Altamimi et al., 2007) or ITRF2014 (Altamimi et al., 2015) versus ITRF2008);
- Earth time variable gravity field models (by using various up-to-date time variable gravity field models).

For this purpose, we have chosen TOPEX/Poseidon, since it is a reference altimetry mission used in the SLCCI project for sea level investigations over this time span. We are going to find the upper born estimates of the radial orbit error budget at regional and global space scales at seasonal, inter-annual and decadal time scales due to the most significant factors.



References

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