CLS
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ESA Sea level CCI

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1. CCI Achievements and CCI+

*** What are the major achievements of the whole project, i.e. what are the expected major achievements by the end of Phase 2.**

The Sea Level CCI project has been the opportunity so far to involve the climate research community and define the user requirements for climate applications. The ECV results from the processing of more than 50 years of cumulated altimeter data with the use of dedicated algorithms. The corrections with the most significant impact are the altimeter wet troposphere correction, the use of the ERA-Interim reanalysis for the atmospheric corrections, the orbit solution and an improved instrumental correction for some missions. The ERS-1 & 2 and Envisat ESA missions have benefited from dedicated developments. The work performed contributed to homogenize the altimeter time series in terms of sea level trends and to better characterize and reduce altimetry errors at climate scales. The validation performed by the CRG has led to strong interactions with the climate scientific community and to better understand its needs. The major achievement of phase II will be the production of an improved and homogeneous sea level time series with high accuracy dedicated to climate applications with associated climate indicators (global and regional trends). Some of the uncertainties will be characterized and the accuracy should be as close as possible to the GCOS user's requirements. In addition, specific tasks focus on the improvement of the sea level estimation in coastal areas and in the Arctic Ocean where preliminary investigations suggest very promising results.

*** Which elements of your ECV will be transferable to operational services by the end of Phase 2?**

Among the sea Level ECV products, the monthly maps of sea level anomalies and the associated climate indicators are mature enough to be transferred to operational services

However, the activities related to the ECV production need to be better characterized. In order to ensure climate-quality products, some activities are fundamental. This includes the development of improved algorithms, their validation and selection, the maintenance of historical altimeter missions' databases, the use of reprocessed dataset made available by space agencies as well as the external ECV validation and the link with climate scientists. In addition, this should be noted that some input data required for the computation of the ECV are available with some delay, which prevents us from providing ECV updates at a better rate than approximately one year.

*** Which ECVs/components of your ECV still need R&D to reach the GCOS requirements?**

In spite of the SL ECV relative maturity, GCOS requirements are still not achieved, which requires some additional work (uncertainty characterization, sea level error budget,…). Some specific geophysical altimeter corrections require some improvement (eg. stability of the wet troposphere correction, low frequency corrections of the Earth tide and polar tide). Coastal areas and the Arctic regions are strongly related with climate change and preliminary work within phase II suggest that the sea level estimation in these regions could be significantly improved.

2. Statement of overall progress of project

The project is on schedule. It has been presented at the April 2015 EGU meeting, including the largely distributed 7th newsletter and also at the Liverpool and Mallorca Sea Level workshops, the Sentinel-3 Science workshop and the Paris climate change conference. The technical developments (WP2) required for the reprocessed version (v2.0, planned for 2016) have been finalized. They now are going to be evaluated. The ECV quality assessment performed by the CRG is in progress.

3. Technical info

The following **peer-reviewed papers** from the SL_cci team have been published within the last months:

R.P.Raj, L.Chafik, J. E.Ø. Nilsen, T. Eldevik, I. Halo. (2015a), The Lofoten Vortex of the Nordic Seas. DSR I, 96, pp:1-14, http://dx.doi.org/10.1016/j.dsr.2014.10.011.

R.P.Raj, J. A. Johannessen, J. E.Ø. Nilsen, I. Halo. (2015b), Quantifying mesoscale eddies of the Lofoten Basin. In prep.

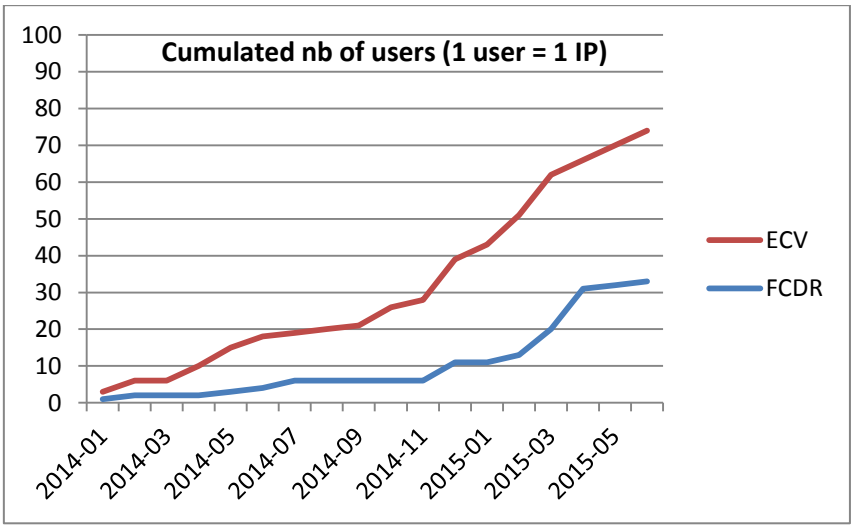
Esselborn, S., Schöne, T., Rudenko, S. Impact of time variable gravity on annual sea level variability from altimetry, the IAG Symposia Series Proceedings of the IAG Scientific Assembly 2013, in press.

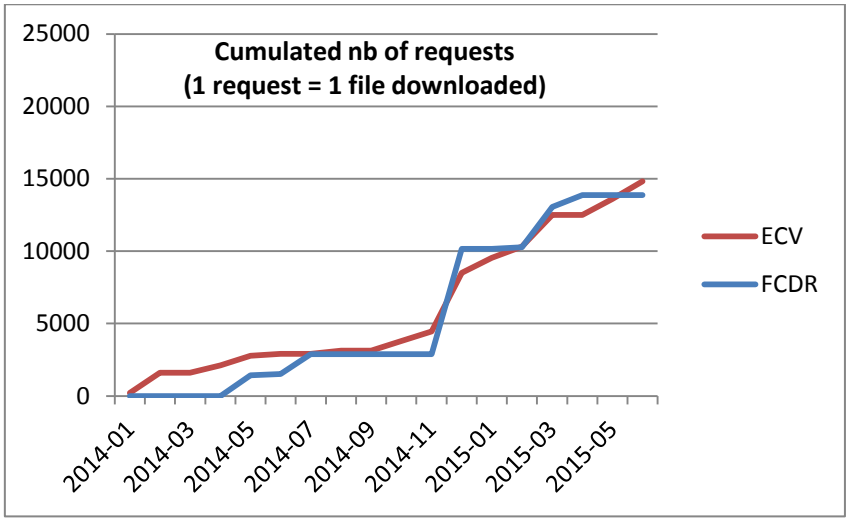
Dieng Habib. B., Hindumathi Palanisamy, Anny Cazenave, Benoit Meyssignac, Karina von Schuckmann. (2015) The Sea Level Budget Since 2003: Inference on the Deep Ocean Heat Content Survey in Geophysics. DOI 10.1007/s10712-015-9314-6.

Dieng H.B., Cazenave A., von Schuckmann K., Ablain M., Meyssiganac B.; Sea level budget over 2005-2013: Missing contributions and data uncertainties, Ocean Sci. Discuss., 12, 701-734, 2015b www.ocean-sci-discuss.net/12/701/2015/doi:10.5194/osd-12-701-2015.

Fenoglio-Marc L., Dinardo S., Scharroo R., Roland A., Dutour, Sikiric M., Lucas B., Becker M., Benveniste J., Weiss R. (2015) The German Bight: a validation of CryoSat-2 altimeter data in SAR mode, Advanced Space Research, accepted, doi: 10.1016/j.1sr.2015.02.014.

Cumulated number of users and downloads of the SL_cci ECV and FCDR ***since Jan. 2014***

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ECV
FCDR