



ESA Sea level CCI

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1. Overall progress of project

The project is on schedule. The technical developments (WP2) required for the reprocessed version (v2.0, planned for 2016) have been finalized. New sea level products dedicated to the Arctic Ocean have been delivered. They now are going to be evaluated. A Selection Meeting (Nov. 25-27th 2015) will be the opportunity to select the best algorithms to be used for the reprocessing. The ECV quality assessment performed by the CRG is in progress. First results have been presented in the Climate Assessment Report, delivered in September.

2. CCI Achievements

* What are the major achievements of the whole project?

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 first results are very promising.

* Project outreach/promotion of data sets. How have the ECV data sets been promoted within the scientific community and what feedback have you received?

Since 2014, about a hundred users have requested access to the SL_cci products, which have led to more than 15 000 downloads of the different ECV+FCDR files. The reasons for these requests are associated with analyses of the global sea level change, ocean circulation and sea level rise globally as well as in some specific regions; ocean dynamics and ocean processes studies, analyses of ocean variability, comparison with ocean models and impact of data assimilation, with tide gauges; comparison with other ECVs (Ocean color, SST); contribution for the design of water limits (coastal infrastructures); contribution for writing a book on climate change and coastal cities.

In addition, the scientific cooperation has been enhanced by the climate Research Group who is comparing the SL_cci ECV with other sea level datasets produced by international teams. A strong cross-CCI collaboration (SL, SST, Sea Ice, Ice Sheets, Glaciers and Ocean Color ECVs) has been initiated during the workshop on "Integrative study of the Sea Level budget" (International Space Science Institute, Bern, 2-6 Feb. 2015), whose goal was to analyze the possibility of closing the sea level error budget with the use of the different CCI ECVs. An exercise of cross comparison of the marine ECVs has also been initiated within the Climate Modeling User Group (CMUG). Thus, the use of the SL_cci ECV is not restricted to the sea level science community.

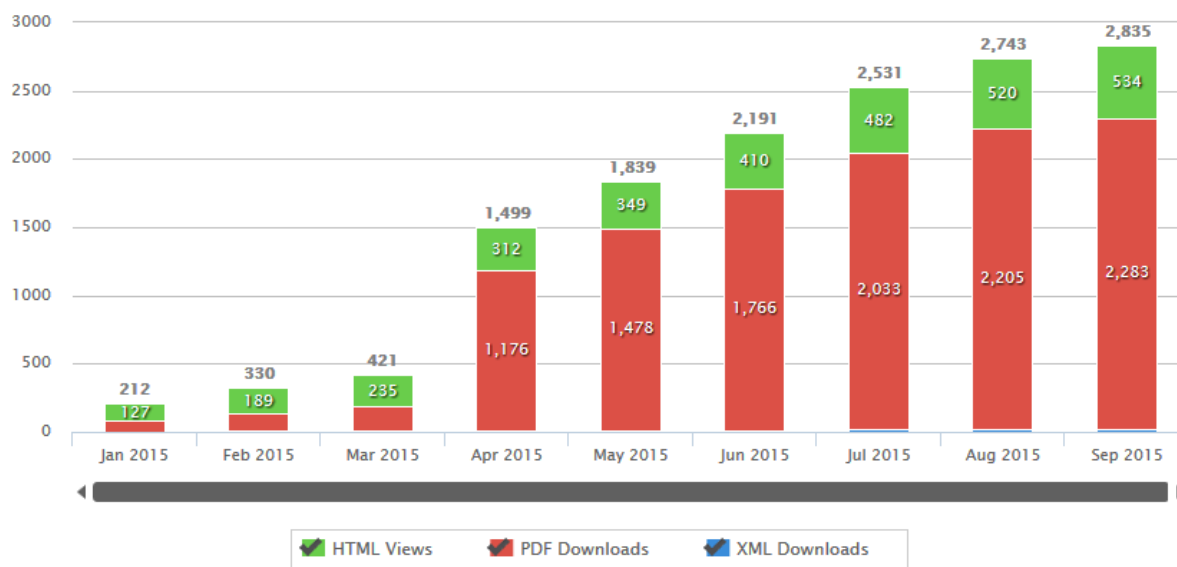
In addition, the SL_cci ECV was promoted through the project website and numerous international conferences where the newsletters of the project have been distributed. The 8th newsletter will be distributed at the 2015 AGU, San Francisco.

User's comments as well as remarks from the CMUG and CRG are being taken into account within phase II.



At last, the cumulative views and downloads of the paper describing the SL_cci project and the ECV (see figure below) (Ablain and SL_cci team; 2015. Improved sea level record over the satellite altimetry era (1993-2010) from the Climate Change Initiative project, *Ocean Sci.*, 11, 67-82, doi:10.5194/os-11-67-2015, 2015) shows that almost 3 000 accesses have been registered in less than 10 months:

Cumulative Views and Downloads (calculated since 13 Jan 2015, article published on 13 Jan 2015)



3. Technical info

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

Dieng H., Cazenave A., von Schuckmann K., Ablain M. and Meyssignac B., Sea level budget over 2005-2013: missing contributions and data errors, *Ocean Science Discussions*, 11, 1-33, doi:10.5194/osd-11-1-2015, 2015.

Dieng H., Champollion N., Cazenave A., Wada Y., Schrama E. and Meyssignac B., Total land water storage change over 2003-2013 estimated from a global mass budget approach, submitted, *Environmental Research Letters*, 2015.

Fernandes, M.J., Lázaro, C., Ablain, M., Pires, N. (2015) Improved wet path delays for all ESA and reference altimetric missions, *Remote Sensing of Environment* 169 (2015) 50-74, <http://dx.doi.org/10.1016/j.rse.2015.07.023>.

Zuo, H., Balmaseda, M. A. and Mogensen, K. (2015) The new eddy-permitting ORAP5 ocean reanalysis: description, evaluation and uncertainties in climate signals. *Climate Dynamics*, 10.1007/s00382-015-2675-1.

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

