



ESA Sea level CCI

Quarterly progress report: Q4 2011

Reference: CLS-DOS-NT-10-322

Nomenclature: SLCCI-QPR-006

Issue: 1. 0

Date: Dec. 14, 11





| Chronology Issues: | | | |
|--------------------|------------|--------------------|------------|
| Issue: | Date: | Reason for change: | Author |
| 1.0 | 14/12/2011 | First issue | Y. Faugere |
| | | | |

| People involved in this issue: | | |
|--------------------------------|------------------|--------------------------------|
| Written by (*): | Y Faugère (CLS) | Date + Initials:(visa or ref) |
| Checked by (*): | G Timms (Logica) | Date + Initial:(visa ou ref) |
| Approved by (*): | G Larnicol (CLS) | Date + Initial:(visa ou ref) |
| Application authorized by (*): | ESA | Date + Initial:(visa ou ref) |

**In the opposite box: Last and First name of the person*

| Distribution: | | |
|---------------|------------------------------------|---|
| Company | Names | Contact Details |
| ESA | J. Benveniste B. Lucas | Jerome.Benveniste@esa.int Bruno.Manuel.Lucas@esa.int |
| CLS | G. Larnicol, Y. Faugere, M. Ablain | glarnicol@cls.fr ; yfaugere@cls.fr ; mablain@cls.fr |
| DTU Space | O. Andersen, P. Knudsen | oa@space.dtu.dk , pk@space.dtu.dk |
| ECMWF | M. Balmaseda | Magdalena.Balmaseda@ecmwf.int |
| GFZ | T. Schöne, S. Rudenko | tschoene@gfz-potsdam.de , rudenko@gfz-potsdam.de |
| IsardSAT | M. Roca | Monica.Roca@isardSAT.cat |
| LEGOS | A. Cazenave | anny.cazenave@legos.obs-mip.fr |
| Logica | G. Timms, G. Busswell, E. Pechorro | gary.timms@logica.com ; geoff.busswell@logica.com |
| NERSC | J. Johannessen | johnny.johannessen@nersc.no |
| UoH | D. Stammer | detlef.stammer@zmaw.de |
| NOC | P. Cipollini | cipo@noc.soton.ac.uk |
| FCUP | J. Fernandes | mjfernan@fc.up.pt |



List of Contents

- 1. Executive Summary 1**
 - 1.1. Scope 1**
 - 1.2. Overall Project Status 1**
- 2. Project Status 1**
 - 2.1. Progress in Last Quarter 1**
 - 2.2. Future Activity in coming 3-6 months 2**



1. Executive Summary

1.1. Scope

The Sea Level CCI responds directly to the GCOS requirements for the Sea level ECV (Product O.2 in GCOS-107) through the generation and validation of multi-mission ECV products from the altimeters on TOPEX/Poseidon and Jason series, as well as ERS1/2, Envisat and GFO. To achieve this global objective, the specific objectives for the Sea Level CCI are:

- To involve the Climate research community to improve the understanding of their needs;
- To develop, test and select the best algorithms and standards in order to produce high quality sea level products for climate applications;
- To assess and collect information on the quality and error characteristics of the Sea Level ECV product through the involvement of independent climate research groups;
- To provide a complete specification of the operational production system that should be developed during the phase 2 of the ESA CCI programme.

1.2. Overall Project Status

In summary, the project is well advanced in meeting its overall objectives. The first main achievement of this year is the finalization of the User Requirements Document (URD), a key output of this project. Further, extensive work has been performed on Algorithm development and selection tasks. Several algorithms have been finalized, and most of the Round Robin Data Package (RRDP) activities have been completed. The results, still under analysis, look very promising with a clear improvement of the sea level time series, in particular for ERS1/2 and ENVISAT ESA missions. These results have been obtained thanks to the involvement of all the Earth Observation teams and also thanks to the coordination with ESA's reprocessing projects. Concerning Envisat we have managed to take corrective actions without impacting on the delivery of the SLCCI ECV products (planned for July 2012). However, concerning ERS-1/2 (Reaper), additional Round Robin activity will be required to take into account any new algorithms. Finally, work has continued on the System Engineering activities, resulting in the delivery of a revised version of the System Requirements Document, and a first delivery of the Systems Specification Document. The team has also been active in supporting ESA's Systems Engineering Working Group.

2. Project Status

2.1. Progress in Last Quarter

In this last quarter the main activity has been the finalization of the Round Robin phase: 50 algorithms have been developed and/or tested, with 35 Round Robin Data Package produced, analysed and made available. The whole altimetry period (20 years) has been used to produce the RRDP, and the new algorithms have been applied on up to 7 missions (ERS-1, ERS-2, Envisat, Jason-1, Jason-2, T/P, and GFO). The production of such extensive results has been made possible by the implementation of a dedicated and robust testing environment based on the DUACS existing system. The validation reports, summarizing the RRDP results, are going to be reviewed by the project's expert Team prior to a selection meeting planned for May 2012. The new algorithms have a strong impact for climate applications. Preliminary results showed that the global MSL derived from ERS-1 / ERS-2 / Envisat using the new CCI standards is impacted at the mm/year level. Significant consistency improvements are also observed on Regional trends, but also on the mesoscale signals. These first SLCCI scientific results were presented at the Ocean Surface Topography and Coastal Altimetry workshops (San Diego, 16-21 October). The SLCCI project also actively participated at the last collocation meeting in ESRIN with several contributions on the round robin methodology and



data & model comparison for the ocean domain. The first version of ECV will demonstrate improvements but as emphasized at the collocation meeting 2, the ECV production process is more of a continuous improvement process rather than a specific development phase and operational production phase. Consequently, it will be relevant to plan for additional ECV products by the end of the project.

2.2. Future Activity in coming 3-6 months

After the development phase and the RRDP phase, the next step of this project is the selection phase where individual algorithms will be selected to generate the SLCCI ECV products. In early 2012, the completed validation reports will be sent to the expert team consisting of 12 international scientists (incl. 6 from USA) for review. The Sea level CCI algorithm selection meeting is currently planned for the first week on May 2012 in Toulouse (2-4 May 2012). In parallel to this selection activity, the development of the SLCCI prototype has started as planned and will continue in the coming months. This processing chain will allow us to produce the Phase 1 SLCCI ECV products and to deliver them in July 2012. These products will be then be validated in 2012-2013 as part of the WP4 task. It will be particularly important to characterize the errors with respect to the different components detailed in the URD. We suggest priority is given to the global mean sea level interannual variability for which interaction with other ECVs (Ice Sheet, glaciers, etc.) would be very useful. In addition, the Systems Engineering team will be providing an updated version of the system requirements document following ESA's review, and will continue work on the design of an operational system, via the System Specification Document (SSD v1). Finally, we plan to promote the SL ECV products during the 20 years of progress in radar altimetry symposium.