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ESA Sea level CCI

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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

The SLCCI now has entered in its second half. The algorithm development and selection tasks are now well advanced. The final choice of the altimetric standards will be done by external experts at the Selection Meeting in May 2012 based on the RRDP and validation reports produced by the Earth Observation Team. Very interesting results have been obtained in various domains and significant improvements were shown for climate applications. Notably, the global MSL derived from ERS-1 / ERS-2 / Envisat using the new CCI standards is impacted at the mm/year level. These significant changes will allow us to produce improved Sea Level CCI ECV products. As previously identified, some ESA (Envisat, ERS1/2) reprocessing projects were not totally in phase with the SL CCI project planning. We have managed to take corrective actions without any impact on the delivery of the SL CCI ECV products (planned in July 2012). Furthermore, it is important to recall that the SLECV products that will be produced in the frame of this project should be considered as a demonstration products rather than as an operational one. Indeed, only a part of the new algorithms included has been assessed in the CCI and additional Round Robin activity would be necessary to take into account these new algorithms and also ensure a fully consistent data set for the whole altimetry period.. In parallel, work has continued on System Engineering activities including an active support to ESA's leadership of the Systems Engineering Working Group (SEWG).

2. Project Status

2.1. Progress in Last Quarter

In this last quarter the project team has worked on finalizing the Algorithm development and selection tasks : 50 algorithms have been developed and/or tested. For each algorithm, Round Robin Data Packages (RRDP) gathering numerous diagnoses have been produced. All these results have been synthesized by the Earth Observation Team in 12 validation reports, 1 for each Sea level component. 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. Some of 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 "Planet under

pressure" symposium in March. In parallel to this selection activity, the set up of the SLCCI database and prototype has continued in the last months.

Regarding System Engineering activity, an updated version of the System Requirements Document has been submitted, and work on the System Specification Document continues. The team remained active in the System Engineering Working Group and continued to support ESA in their leadership of the community.

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 10 international scientists (including 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). The processing chain and associated database will be finalized, taking into account the outcome of the selection meeting. The production of the Phase 1 SLCCI ECV products shall start in May and we expect 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, SST,etc.) would be very useful. In addition, the Systems Engineering team will act immediately on any required actions following feedback from review of the updated System Requirements Document, and continue work on the specification of the operational system through the System Specification Document. Finally, we plan to promote the SL ECV products during the EGU meeting and the 20 years of progress in radar altimetry symposium in September.