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ESA Sea Level Climate Change Initiative

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Sea level is a very sensitive index of climate change and variability. As the ocean warms in response to global warming, sea waters expand and, as a result, sea level rises. When mountain glaciers melt in response to increasing air temperature, sea level rises because more freshwater glacial runoff discharges into the oceans. Similarly, ice mass loss from the ice sheets causes sea-level rise. Therefore, understanding the sea level variability and changes implies in addition to the understanding of the ocean variability and the exchanges between ocean, land, cryosphere, and atmosphere, an accurate monitoring of the sea level variable at climate scales. That is why Sea Level is one of the variables selected in the frame of the ESA Climate change Initiative (CCI) program initiated by ESA in July 2010. In overall, this program aims to provide an adequate, comprehensive, and timely response to the extremely challenging set of requirements for highly stable, long-term satellite-based products for climate, that have been addressed to Space Agencies via the Global Climate Observing System (GCOS) and the Committee on Earth Observation Satellites (CEOS).

In order to achieve this global objective, the specific objectives of the sea level CCI project are: to involve the climate research community to collect their needs and feedbacks on product quality, to develop, test and select the best algorithms and standards to generate a climate time series (so called SL ECV products), and to provide a complete specification of the production system. After two of projects the first two objectives have been completed.

Hereafter, we aim to provide an overview and the current status of the Sea Level project of the ESA Climate Change Initiative (CCI) that has started in july 2010. The main objective of this project is to produce and validate the Sea Level Essential Climate Variable (ECV) product. Two years after the project kick-off, the 20 Years of Progress in Radar Altimetry Symposium was the opportunity to unveil this 18 years climate time-series based on satellite altimetry measurements. We also describe the different activities which were necessary to deliver the ECV products: collect and refine the user requirements, develop, test and select the best algorithms for climate applications. The production system and a brief description of the main product characteristics are provided as well as preliminary results of the product validation.