



Global sea level budget and ocean mass budget assessment: initial results from ESA's CCI Sea Level Budget project

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Studies of the sea level budget are a means of assessing and understanding how sea level is changing and what are the causes. Closure of the total sea level budget implies that the observed changes of global mean sea level equal the sum of observed (or otherwise assessed) contributions, namely changes in ocean mass and ocean thermal expansion. Closure of the ocean mass budget implies that the observed ocean mass change equals assessed changes in mass from glaciers, ice sheets, land water storage, snow pack and atmospheric water content. Misclosure of these balances indicates errors in some of the components or contributions from missing or unassessed elements in the budget.

ESA's Climate Change Initiative (CCI) has conducted a number of projects related to sea level, namely the Sea Level CCI project, the Greenland and Antarctic Ice Sheet CCI projects, the Glaciers CCI project and the Sea Surface Temperature CCI project.

The aim of the CCI Sea Level Budget Closure project, launched in April 2017 is to use the CCI data products, together with further data products provided by the project partners to re-assess the sea level budget and ocean mass budget. Specifically, the project further develops and analyzes products based on the CCI projects mentioned above in conjunction with data products from ocean profilers (e.g., Argo), GRACE-based ocean mass change assessments, and model-based data for glaciers and land hydrology. The work benefits from directly involving the expertise on the product generation for all the involved sea level contributions.

The presentation will report on the initial assessment of global sea level budget and global ocean mass budget closure. This initial assessment uses data products that were available by the beginning of the project. We focus on two periods: 1993-2015 (the altimetry period) and 2003-2015 (the GRACE / ARGO period). We consider the budget of the long-term trends as well as the budget of the overlaid interannual variations. A special focus is on the account for uncertainties of the individual contributions, building on the expertise of all project partners. We find that the budget is closed within uncertainties. Systematic uncertainties in the ocean mass change estimates appear to dominate the uncertainty budget.