



Antarctic and Greenland ice sheet mass balance products from satellite gravimetry

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Because of their important role in the Earth's climate system, ESA's Climate Change Initiative (CCI) has identified both the Antarctic Ice Sheet (AIS) and the Greenland Ice Sheet (GIS) as Essential Climate Variables (ECV). Since respondents of a user survey indicated that the ice sheet mass balance is one of the most important ECV data products needed to better understand climate change, the AIS_cci and the GIS_cci project provide Gravimetric Mass Balance (GMB) products based on satellite gravimetry data. The GMB products are derived from GRACE (Gravity Recovery and Climate Experiment) monthly solutions of release ITSG-Grace2016 produced at TU Graz. GMB basin products (i.e. time series of monthly mass changes for the entire ice sheets and selected drainage basins) and GMB gridded products (e.g. mass balance estimates with a formal resolution of about 50km, covering the entire ice sheets) are generated for the period from 2002 until present. The first GMB product was released in mid 2016.

Here we present an extended and updated version of the ESA CCI GMB products, which are freely available through data portals hosted by the projects (https://data1.geo.tu-dresden.de/ais_gmb, <http://products.esa-icesheets-cci.org/products/downloadlist/GMB>). Since the initial product release, the applied processing strategies have been improved in order to further reduce GRACE errors and to enhance the separation of signals super-imposed to the ice mass changes. While a regional integration approach is used by the AIS_cci project, the GMB products of the GIS_cci project are derived using a point mass inversion. The differences between both approaches are investigated through the example of the GIS, where an alternative GMB product was generated using the regional integration approach implemented by the AIS_cci. Finally, we present the latest mass balance estimates for both ice sheets as well as their corresponding contributions to global sea level rise.