

High-resolution pattern of secular ice mass loss for Greenland from tailored GRACE solutions

Annette Eicker, Judith Schall, Jürgen Kusche

Institute of Geodesy and Geoinformation, University of Bonn, Germany

Earlier GRACE studies confirmed that the Greenland ice sheet loses mass at a rate equivalent to about 0.6 mm per year sea level rise, and that this loss is spatially concentrated at the south-eastern and north-western coasts, while some central regions actually gain mass through net accumulation of snow. However, the detailed spatial distribution is unclear due to the limited resolution of the GRACE data products. In this study, we will use the latest GRACE level 2 time series (GFZ-RL05) to derive a Greenland mass trend pattern with unprecedented spatial resolution, allowing to identify mass loss associated with individual glaciers. We will then show that these results can be further improved by deriving a regional mass trend pattern directly from the GRACE level 1B observations, using a radial basis functions approach and an implicit smoothing procedure tailored to the signal-to-noise ratio over Greenland. We furthermore provide a new overall mass change estimate for the complete Greenland area derived from the regional GRACE solutions.