



## **Present-day regional mass changes in Antarctica from GRACE**

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We investigate *ca.* 3.5 years of GRACE gravity-field solutions to infer present-day regional mass changes in Antarctica. Our approach involves a two-step noise reduction in the GRACE potential coefficients' temporal trends, consisting of statistical reliability tests of the inferred trends and an optimized smoothing of the gravity field. Then, the largest geoid changes over Antarctica are fitted by a three-region model describing the most prominent mass changes, which are due to glacier melting in the Amundsen Sea Sector, the Antarctic Peninsula, and glacial-isostatic adjustment (GIA) around the Ronne Ice Shelf. We determine mass-loss rates for the Amundsen Sea Sector, which are consistent with the values derived from other GRACE analyses and from satellite altimetry. We demonstrate that using the noise-reduction approach the uncertainty of the GRACE estimates for the Amundsen Sea Sector lies below 10%, based on the formal calibrated GRACE error. The values inferred for the Antarctic Peninsula and for the GIA signal over the Ronne Ice Shelf are consistent with predictions, but sensitive to the contamination by unmodeled processes, such as the Antarctic Circumpolar Current and ocean tides beneath the Ronne Ice Shelf. We conclude that, at present, in these regions the interpretation of GRACE mass-change estimates in terms of ice-mass loss and GIA cannot be done with complete confidence.