



Glacial Isostatic Adjustment over Antarctica from combined GRACE and ICESat satellite data

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The determination of present-day changes in the Antarctic mass balance through satellite gravity measurements is severely hampered by insufficient knowledge of ongoing glacial isostatic adjustment (GIA) due to the historic deglaciation in the Late-Pleistocene. Previous studies have speculated that it might be possible to distinguish between signals of ongoing GIA from past ice mass changes through the combination of satellite gravimetry and satellite altimetry; however, no conclusive results have been produced to date. In this study, it is shown that by combining gravity and altimetry data from the GRACE and ICESat satellite missions over the period March 2003 – March 2007, the GIA contribution can indeed be isolated. The inferred GIA signal over the complete Antarctic continent supports Late-Pleistocene ice models derived from glacio-geologic studies, with important differences over the two main ice-shelves. The GIA impact on GRACE-derived estimates of mass balance is found to be about 80 Gt/yr.