



Re-assessing the influence of glacial-isostatic adjustment on Antarctic ice-mass balance estimated from GRACE

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Satellite gravimetry observations of the contemporary ice-mass balance in Antarctica are strongly influenced by mass movements in the Earth interior induced by ice-load variations during the last glacial cycle, i.e. the glacial-isostatic adjustment (GIA). Newly available GPS observations collected within the POLNET project (www.polnet.org) represent a valuable constraint on GIA models predicting surface deformation and gravity-field change in Antarctica. Here, we re-assess the influence of GIA on Antarctic ice-mass balance estimated from the Gravity Recovery and Climate Experiment (GRACE). For this, we apply a viscoelastic Earth model, accounting for the rheological differences between East and West Antarctica, to three independent glacial histories ICE-5G (Peltier, 2004), IJ05 (Ivins & James, 2005) and HUY (Huybrechts, 2002). We predict the associated Antarctic GIA signal. With a stochastic approach, the glacial histories are regionally modified to satisfy GPS, GRACE as well as the combination of both observation types. We assess the influence of constraining GIA with GPS/GRACE on the reduction of the error budget of Antarctic ice-mass balances from GRACE.