



Towards accurate observation and modelling of Antarctic glacial isostatic adjustment

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The response of the solid Earth to glacial mass changes, known as glacial isostatic adjustment (GIA), has received renewed attention in the recent decade thanks to the Gravity Recovery and Climate Experiment (GRACE) satellite mission. GRACE measures Earth's gravity field every 30 days, but cannot partition surface mass changes, such as present-day cryospheric or hydrological change, from changes within the solid Earth, notably due to GIA. If GIA cannot be accurately modelled in a particular region the accuracy of GRACE estimates of ice mass balance for that region is compromised.

This lecture will focus on Antarctica, where models of GIA are hugely uncertain due to weak constraints on ice loading history and Earth structure. Over the last years, however, there has been a step-change in our ability to measure GIA uplift with the Global Positioning System (GPS), including widespread deployments of permanent GPS receivers as part of the International Polar Year (IPY) POLENET project. I will particularly focus on the Antarctic GPS velocity field and the confounding effect of elastic rebound due to present-day ice mass changes, and then describe the construction and calibration of a new Antarctic GIA model for application to GRACE data, as well as highlighting areas where further critical developments are required.