



Ongoing deformation of Antarctica following recent Great Earthquakes

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The secular motion of Antarctica is thought to be almost everywhere governed by horizontal rigid plate rotation plus three-dimensional deformations due to past and present changes in ice-ocean loading, known as glacial isostatic adjustment (GIA). We use geodetic data to investigate deformation following the 1998 magnitude ~ 8.1 Antarctic intra-plate Earthquake, and show sustained three-dimensional deformation along East Antarctica's coastline, 600 km from the rupture location. Using a model of viscoelastic deformation we are able to match observed northward velocity changes, and either east or height, but not all three directions simultaneously, apparently partly due to lateral variations in mantle rheology. Our modeling predicts much of Antarctica may still be deforming, with further deformation possible from the 2004 Macquarie Ridge Earthquake. This previously unconsidered mode of Antarctic deformation affects geodetic estimates of plate motion and GIA; its viscous nature raises the prospect of further present-day deformation due to earlier Great Earthquakes.