Geophysical Research Abstracts
Vol. 15, EGU2013-13305, 2013
EGU General Assembly 2013

Postglacial rebound in Antarctica: Assessing the fit of ICE-6G (VM5a) to GPS and geologic data

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Observation of 50 GPS sites and available geologic data are used to estimate uplift and horizontal motion in Antarctica. We find that Antarctica is, in the horizontal, nearly rigid, except that: O'Higgins, at the tip of Antarctica peninsula, is moving southeast relative to the Antarctica plate at 2.5 mm/yr, and the south margin of Ronne ice shelf is moving horizontally away from the ice center at about 1 mm/yr, in viscous response to unloading of grounded ice there several ka.

New GPS observations in the west Antarctic interior constrain uplift more tightly than before, placing an upper bound on postglacial rebound. ICE-6G (VM5a), the revised postglacial rebound model that we fit to all available geodetic and geologic data, yields enough ice loss from 12 to 4 ka to raise global sea level 15 m, an 18 per cent reduction relative to prior model ICE-5G (VM2). Ice thickness is cut roughly in half in at the middle of Antarctic Peninsula and by 1/3 south of Ronne ice shelf.