



The new ICE-6G (VM5a) model of the Global Process of Glacial Isostatic Adjustment

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We describe the most recent refinement of the Toronto model of glacial isostatic adjustment (GIA) process, a refinement that has been achieved by bringing to bear the totality of the available GPS measurements of vertical motion of the crust from all of the continents from which significant land ice cover was lost during the most recent glacial-interglacial transition. Although the required modifications of the precursor ICE-5G model have been modest over Eurasia and the British Isles, highly significant modifications of the ice cover over North America have been required to eliminate the misfits to the GPS data identified in Argus and Peltier (2011). Similarly significant modifications to the deglaciation history of Antarctica have also been required to fit our newly compiled data base of GPS measurements from this southern hemisphere continent. For the North American continent, the glacial isostatic adjustment of which is uncontaminated by modern land ice variations we employ the GRACE time dependent gravity data to test the quality of the solution delivered by a refinement procedure that is based solely upon use of the GPS observation. The procedure is shown to produce a much improved fit to the GRACE data which were not employed to obtain it. For Antarctica, as for Greenland, where the isostatic adjustment is strongly influenced by modern land ice disintegration, we draw attention to sedimentary core records which fix the timing of the onset of rapid deglaciation to the time of meltwater pulse 1B in the Barbados record. We point to a series of relative sea level records from the northern hemisphere which record the impact of this late reaction of Antarctic ice cover to disintegration of the northern hemisphere ice sheets. A new inference using the GIA corrected GRACE data for the modern rate of Antarctica ice loss is provided.