

Recent advances in the modelling of glacial isostatic adjustment – A report from the IAG Joint Study Group on “Geodetic, Seismic and Geodynamic Constraints on Glacial Isostatic Adjustment”

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Abstract. Glacial isostatic adjustment (GIA) is a process that drives a dynamic present-day displacement, gravitational changes, rotational parameters, stress state, and sea-level, both in the open ocean and at coastal environments. These changes occur over the entire globe. Furthermore, they may be integrally related to changes in massive ice sheets as measured from space. The computation of forward and inverse GIA models is critical to proper simulation of past, recent, and future changes in Earth’s topography, gravity, rotation, stress state, sea-level, and the stability of the reference frames. Current models depend on many parameters, including the structure of the Earth’s interior, including both the radial and lateral structure. As part of a newly established joint study group within IAG, we draw together new model capabilities from several disciplines: geodesy, seismology, mineral physics, laboratory-based creep laws, and geodynamics to create a dialogue between these disciplines to better inform the implementation of state-of-the-art Earth models and quantify their influences on geodetic observations. Here, we will present an overview of recent advances and upcoming procedures to better characterize and determine a higher fidelity estimate of GIA variables (e.g., velocity, time-varying sea surface and gravity fields). These estimates will, in turn, serve as important input parameters for use across many different geoscientific disciplines.