

Glacial isostatic adjustment - its role in modelling of sea level variations

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Abstract

Changes in climate influence the distribution of ice and water over the Earth's surface, which, in turn influence the climate itself. Ice accumulation or ablation followed by changes in sea level induce glacial-isostatic adjustment of the solid Earth. Conversely, the solid-Earth deformation influences a rise and fall of sea level. Moreover, the redistribution of ice and water and changes in the mass distribution in the Earth's interior are capable to induce perturbations in the rotation of the Earth, both in direction and magnitude of the rotation vector. A wander of the rotation axis, in turn, induces variations in the centrifugal potential and, subsequently, variations in the sea level. All this means that the determination of sea level variations coupled with polar wander due to changes in ice–water mass load is a complex geophysical and mathematical problem.

The theory and modelling of glacial isostatic adjustment have been rapidly developing since the launch of the GRACE satellite gravity mission in 2002. The lecture presents an overview what has been achieved in the theory and data assimilation on a precise modelling and prediction of glacial isostatic adjustment.