GLACIAL-ISOSTATIC ADJUSTMENT AND RECENT SEA-LEVEL CHANGE: THE INFLUENCE OF PLEISTOCENE ICE-SHEET EVOLUTION ON TIDE-GAUGE MEASUREMENTS

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The solution to the sea-level equation describing the redistribution of glacial melt water in the oceans is implemented in conjunction with the spectral-finite element method (Martinec, 2000) of modelling glacial-isostatic adjustment (GIA). The main feature of this method is that it solves the field equations governing GIA in the time domain, where a radially symmetric, self-gravitating, incompressible earth model consisting of a fluid core, a Maxwell-viscoelastic lower and upper mantle, and an elastic lithosphere has been adopted in the present study. The additional contribution to sea-level caused by the variation of the Earth's rotation due to the ice-water mass redistribution is determined by means of the Liouville equation. For predicting the GIA-induced sea-level change, three different global models of the Pleistocene deglaciation and several viscosity stratifications are used.

We compare the predicted postglacial sea-level change induced by the Pleistocene deglaciation with a set of globally distributed sea-level index points and evaluate the acceptability of the underlying earth and ice models. The best-fitting models are employed to remove the GIA-induced contribution to the recent sea-level change recorded by a set of Fennoscandian tide-gauge stations. In future studies, the reduced tide-gauge trends may serve as a datum when studying the relation between recent ice-mass change and absolute sea-level rise.