

Northern Hemisphere ice-sheets simulation using a coupled ice-sheet/earth rebound/climate model

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Feedback between changes in the ice-sheet/climate and the earth's isostatic rebound is considered to be a key process for the evolution of the past Northern Hemisphere ice-sheets in glacial cycles. We report numerical experiments of the past northern hemisphere ice-sheets during several hundred thousands years using a coupled ice-sheet/earth rebound model with combination of climate parameterization computed based on a series of sensitivity studies using the general circulation model MIROC (Abe-Ouchi 2013). A self-gravitating visco-elastic multi-layer model developed by Okuno and Nakada (2001) is coupled to an numerical ice-sheet model IcIES (Abe-Ouchi 2013). The results are compared with the previous IcIES results which coupled with a simple isostatic model (i.e., a local lithosphere/relaxing asthenosphere) which is controlled by two parameters (the mantle density and the time scale of isostatic response), in order to discuss the effect of more realistic visco-elastic structure of the earth.

Keywords: Ice-sheet modeling, Isostatic rebound