

Development and Application of a coupled ice-sheet/earth rebound model for Antarctic and Northern Hemisphere ice-sheets

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Feedback between changes in the ice-sheet and the earth's isostatic rebound is considered to be an important process for the evolution of the past ice-sheets in glacial cycles. Moreover, a complex feedback between marine ice sheet and underlying bedrock may influence on ice-sheet instability and irreversibility.

We have been developing a coupled ice-sheet/earth rebound model which were applied for past northern hemisphere ice sheet simulation during glacial/interglacial cycles. Recently the model has been extended also over Antarctic ice sheet. Earth rebound model is based on a self-gravitating visco-elastic multi-layer model developed by Okuno and Nakada (2001), while the ice-sheet model is IcIES (Abe-Ouchi et al. 2013, Saito and Abe-Ouchi 2010, Saito et al 2016).

In the presentation, we will report current status of model development and its application. The results are compared with the previous IcIES results 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.