表面質量収支モデルおよび初期化方法に対する グリーンランド温暖化応答の感度実験

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Sensitivity of Response of Greenland Ice Sheet to Global Warming on Surface Mass Balance and Initialization methods

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We present a series of numerical experiments of Greenland ice sheet under global warming condition using Ice sheet model for Integrated Earth system Studies (***I*$_C$*IES***). In this study, influence on the simulation from the difference in the method to compute the surface mass balance is focused. Typically, ice sheet simulation is driven by a *reference-anomaly* method, in which the surface temperature and/or the accumulation are decomposed into the reference terms (e.g., observation), the anomaly (e.g., climate scenario from climate models). Then the surface melting is computed using parameterization such as positive degree-day (PDD) method with the temperature. These decomposed terms have own uncertainties, which may influence the ice-sheet simulation. In this study, impact of these properties to the present-day control case, as well as the response under uniform warming condition are discussed, which is thought be a useful and basic information of the property/sensitivity of the Greenland ice sheet.

In addition, several initialization methods (free spin-up, fixed-topography spin-up, etc) are applied to ***I*$_C$*IES*** in order to evaluate the influence of the error in the present-day simulated topography to the short-term response of Greenland ice sheet.

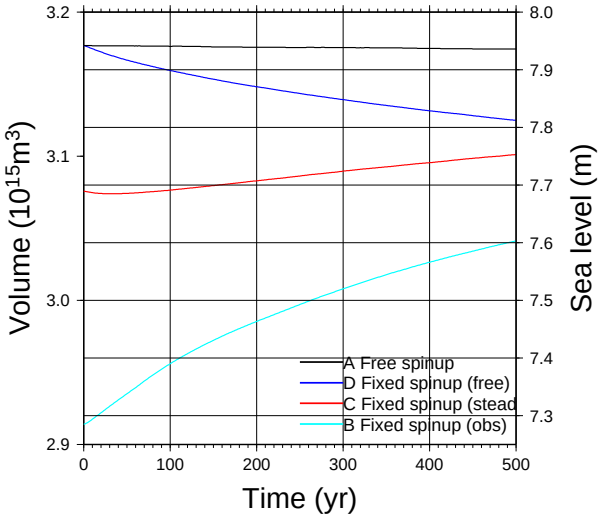

Fig. 1. Time series of simulated ice-sheet volume under control climate

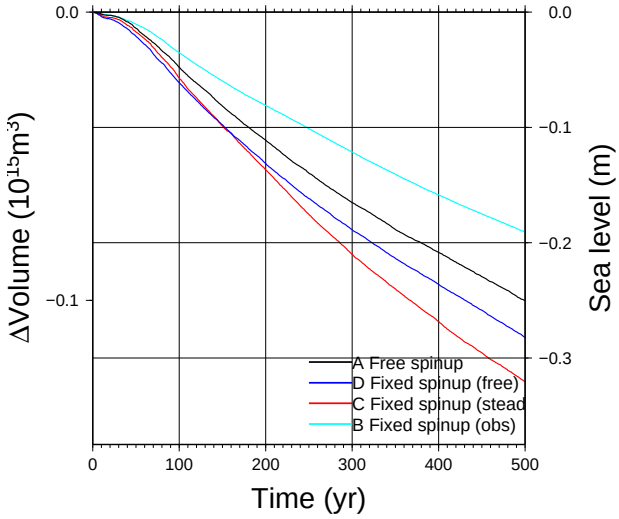

Fig. 2. Time series of simulated ice-sheet volume under a global warming scenario relative to the control climate. Climate forcing scenario as well as other boundary conditions follow SeaRISE configuration (Bindschadler et al., 2013).