

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

SAITO, Fuyuki<sup>1\*</sup> ; ABE-OUCHI, Ayako<sup>2</sup> ; TAKAHASHI, Kunio<sup>1</sup>

<sup>1</sup>JAMSTEC, <sup>2</sup>AORI, Univ. of Tokyo

We present a series of numerical experiments of Greenland ice sheet under global warming condition using Ice sheet model for Integrated Earth system Studies (IcIES).

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 to 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 IcIES in order to evaluate the influence of the error in the present-day simulated topography to the short-term response of Greenland ice sheet.

Keywords: Greenland ice sheet, Ice-sheet model