Sensitivity studies of the position and elevation of Dome Fuji, Antarctica using a high-resolution numerical ice-sheet model with revising the bedrock topography data by JARE-59

SAITO Fuyuki[1], Shun Tsutaki[2], Ayako Abe-Ouchi[3,1,2], Takashi Obase[3], Shuji Fujita[2,4], Kenji Kawamura[2,4]

[1]*Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Japan*

[2]*National Institute of Polar Research, Research Organization of Information and Systems(ROIS), Japan*

[3]*Atmosphere and Ocean Research Institute, The University of Tokyo, Japan*

[4]*Department of Polar Science, The Graduate University for Advanced Studies (SOKENDAI), Japan*

Ice divides are important locations for deep drilling on ice-sheets. Precise computation around a divide requires spatially very high resolution due to the characteristics of ice-flow around the divide, therefore, one effective way to simulate the evolution of divide flow for a long time scale (e.g., more than 1Myr) is to apply a `nesting' of a local high resolution model into a large low resolution model. Moreover, ice flow pattern is significantly different between an ice divide and the other areas: the flow around the divide requires more terms to compute than the other area, which prefers a nesting model again. A simple way to introduce the nesting is to fix the nested area through the computation, therefore, sensitivity of the ice-divide shapes (position and/or elevation) to changes in various boundary conditions should be investigated beforehand.

In addition, characteristics of ice-flow around the divide is sensitive to the underneath bedrock topography. Saito (2002) and its continuation studies have been presented a series of numerical experiments of Antarctic ice sheet using an ice-sheet model IcIES. Possibility of changes in the position of Dome Fuji driven by the evolution of glacial/interglacial climate, as well as a variety of ice-grounded area are discussed, however, all the simulation is based on BEDMAP-2 data set (Fretwell et al. 2013), which does not include the observation by JARE-59 and after. In this study, the work of Saito (2002) is updated using a latest version of IcIES with higher resolution (8km), with updating the bedrock topography around dome Fuji by the data set based on JARE-59 observation.