# Prediction Experiments of the Arctic Oscillation Index in 2005/06 and 2006/07 Winter Using a Barotropic General Circulation Model

# Shingo Kato[1]; Hiroshi Tanaka[2]

[1] Geoscience, Univ. Tsukuba; [2] CCS, Univ. Tsukuba

The Arctic Oscillation (AO) is one of the dominant atmospheric variabilities characterized as opposing atmospheric pressure patterns in middle and high latitudes. The oscillation exhibits a positive phase with relatively low pressure over the polar region and high pressure at mid-latitudes. The AOI is an index of the winter weather in the Northern Hemisphere. The AO is defined as the first empirical orthogonal function (EOF-1) of sea-level pressure (SLP) in the Northern Hemisphere. As the variance of SLP is equal to that of the barotropic component, it is considered that the construction of a barotropic general circulation model is useful.

The model used in this study is the barotropic S-Model at the University of Tsukuba described in Tanaka (2003, JAS). This model predicts the barotropic component of the atmosphere with an external forcing of the barotropic-baroclinic interactions.

In this study, we investigated whether long-term prediction of the Arctic Oscillation Index (AOI) would be possible, using the barotropic S-Model. In order to correct the bias of the model, the ensemble forecast using some error averages before an initial time was also performed.

As a result, it is demonstrated that AOI can be predicted exceeding two weeks in many forecast experiments. And the ensemble forecast in consideration of the bias was fairly good. Therefore, it is thought to be effective to use the ensemble forecast. On the other hand, the forecast occasionally changed a lot depending on the different periods of initial conditions. In order to improve the prediction skill, it is thought that we need to conduct more prediction experiments and examine the characteristics of the model, and to consider another method to correct the bias of the model.