

Prediction Experiments of a Blocking Anticyclone at the End of January 2007

Keiichi Kondo[1]; Hiroshi Tanaka[2]

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

The blocking is a phenomenon in which the jet stream meanders north and south on a large scale. Generally the jet stream is flowing east and west. Traveling anticyclones and cyclones move along the jet stream, so their courses are disturbed by the blocking. In surrounding areas of such a blocking, it often suffers from unexpected weather. The period of such a blocking is 1 week to 1 month.

There are two types of the blocking. The first is that there are an anticyclone in high latitudes and a cut-off low in low latitudes. Its pattern is called a dipole type. The second is that there is only one anticyclone in high latitudes and a cut-off low is absent. Its pattern is called an omega type. As a common feature, the jet is divided by the blocking and makes a detour to avoid the blocking.

In this study we conducted prediction experiments about a blocking in January 2007, using a barotropic S-model developed at the University of Tsukuba. The initial conditions are set from 00Z of 20 January to 7 February, 2007. That blocking appeared at the West Coast of the USA on January 28. The blocking had a lot of influences on the Midwest and northeastern USA, the southern Canada, and Alaska in the Arctic. Therefore the predicting blocking is important in not only the scientific interest but also the social impact.

According to the results, the blocking was not able to predict from the initial condition of 23 January. But it was able to predict from the initial condition of 24 January. We found that prediction by the barotropic S-model highly depended on a little difference in an initial condition. The barotropic S-model has a property of strong linearity. Even if a little error is contained in an initial value, the error does not grow in a short time. In this case study, however, the little error became one of causes of large difference and the blocking appeared. This result indicates the possibility of the ensemble forecast from the initial perturbation for the barotropic S-model. On the other hand, the barotropic S-model has a large model bias, and there is another ensemble S-model which considers different model biases. Using such ensemble S-models, there is a possibility that we can predict this blocking more than single forecast.