Numerical Study of Climatic Rainfall distribution over Tohoku and Hokuriku Region in Japan Area during Winter Monsoon Season

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It is expected to predict the water resource, especially snowfall, from the view point of the natural disasters and the agricultural water supply around Tohoku and Hokuriku region in Japan. Although some studies for the prediction of hydrological cycle process are conducted using regional climate models and hydrological models, there are few fruits because those studies just begun in a few years ago, and the numerical models still have a lot of problems. Many atmospheric climate model studies are conducted using more than 20km horizontal grid space, however, it is not enough to simulate the detailed precipitation including the snowfall exactly. Our group is planning to conduct the cloud resolved simulation during winter monsoon season using the Earth Simulator computer system, and investigate the possibility of prediction of water resource.

Features of both the large snow fall year from Dec.1983 to Mar.1984 and the small year from Dec.1989 to Mar.1990 are represented using a regional climate model every one month of each year in this study. The large and small year are defined by the calculated total volume of snow using the observation data and a hydrological model.

The large amount of precipitation appears in the coastal area of Japan Sea, Tohoku, Hokuriku, and Sanin region when the northwesterly wind has tendency to strong during winter monsoon season (e. g Jan.1990).This feature of precipitation distribution is reproduced by the model. On the contrary, the large amount of precipitation appears in the coastal area of Pacific Ocean side of Japan, and the precipitation in Tohoku, Hokuriku, and Sanin region becomes small when the northwesterly wind has tendency to weak during winter monsoon season (e.g.Feb.1990). Although the small amount of precipitation in the coastal are of Japan Sea is represented by the model, the precipitation in the Pacific Ocean side of Japan is not enough to be simulated. It is speculated that the calculation domain is too small to represent the precipitation distribution exactly. The difference of precipitation distribution between the large snow year and small year is qualitatively reproduced by the regional climate model in Tohoku, Hokuriku, and Sanin region during the winter monsoon season.

More study is needed to investigate the mechanism of the difference of precipitation between the large snow year and small snow year.