Development of gms: a library which makes depelopment of grid models easy

\# Masuo Nakano[1]; Kensuke Nakajima[2]

[1] Earth and Planetary Sci., Kyushu Univ; [2] Dept. of Earth & Planetary Sci., Faculty of Sci., Kyushu Univ.

Recently, the field of meteorological study, it is becoming easy to simulate the real atmosphere by using numerical models. There is two reasons for such trend. First, performance of cheap personal computers are growing rapidly. Second, community models which can simulate the real atmosphere very well are developed and distributed widely.

However, when we want not only to simulate the real atmosphere but also to understand the result of simulation, we must often compare the result of realistic models to the result of more simplified and idealized models. To do such comparisons, we obviously need appropriately idealized models.

There are two way to obtain such idealized models. First, we modify the complex model into such models. Second, we develop such models from scratch. However, generally, neither modification of complex models nor development of models from scratch is not easy. In numerical fluid models written in fortran, there are large number of operations of array. Associated with such array operations, we must type many subscripts. Writing many array scripts often lead us to making bug. This is one of reasons for difficulty in developing or modifying numerical models.

In order to develop numerical models easily and safely, we are developing a library ``grid modeling system'' (gms) using new features of fortran90 (e.g., module, derived type, user-defined operation, etc.).When we develop numerical models with gms, it is almost unnecessary to type array subscripts even when we construct a three-dimensional convection model by using a staggered grid.

Detail and some example of its usage will be presented at the meeting.