Simulations of Geophysical Fluids and Planetary Atmospheres

Brief Introduction:

Atmospheric circulation is one of the important applications of computer simulation. In fact, atmospheric models are used for daily weather prediction and climate prediction of the Earth's atmosphere. In addition, atmospheric circulation models are used for research of atmospheres of planets, such as Mars.

Project:

The project will work on the simulations of atmospheres of the Earth or Mars by use of a pre-existing codes, DCPAM*, or some geophysical fluids in simple systems by making codes. Some lectures and tutorials will be given during a first week. Followings are plausible topics which participants can select based on one's experiences and interests.

- Perform simulations of Earth's or Mars' atmospheres by use of the DCPAM,
- Make a code for geophysical fluids, such as a two-dimensional turbulence, a shallow water system, and a three-dimensional fluid, and perform simulations,
- Make a tracer transport codes which calculate advection by a meteorological fields, and perform simulations.

Programing language:

Fortran: Experiences on coding Fortran90 program are helpful, but those who are not familiar to Fortran90 are welcome.

Project Leader:

Yoshiyuki O. Takahashi (Department of Planetology, Kobe University, Japan)

* DCPAM: Planetary atmosphere general circulation model developed by members of GFD** Dennou Club. See http://www.gfd-dennou.org/library/dcpam/index.htm.en for more information of the model.
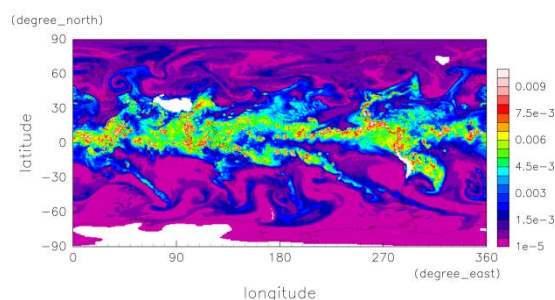
** GFD: Geophysical Fluid Dynamics

Figure. An example of water vapor distribution in the Earth's atmosphere simulated by the DCPAM