

# Coupling isobaric physics with isochoric dynamics

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The Japan Meteorological Agency has been operating a regional nonhydrostatic model which employs constant height-based coordinate. The model couples physical processes that used to be adopted by the former operational models with hydrostatic assumption and pressure-based vertical coordinate. In converting tendencies evaluated by physics to those of prognostic variables of the dynamical core, differences of some assumptions between the dynamics and the physics have to be taken into account. Because the dynamics core adopts the finite volume method and employs total density as a prognostic variable, it is the simplest way to assume that total density in each cell is kept constant. With this coupling method, latent heat released by the microphysics process makes the pressure increased in constant volume cells, and then the local high pressure is mitigated through the following dynamics steps. Since this representation of the process seems to be unrealistic, we have just started to explore ways to achieve the consistency in the coupling, such as incorporating the change of cell volume in physical processes.

In the presentation, we will talk about our recent attempt on the issues.