

Development of a new numerical simulation code for 3-dimensional mantle convection in a spherical shell using Yin-Yang grid method

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We have developed a new finite difference code to solve the thermal convection of Boussinesq fluid with infinite Prandtl number in a three-dimensional spherical shell. Our code is applied to the mantle convection problems of terrestrial planets using Yin-Yang grid system [Kageyama, 2003] which is a kind of Chimera or overset grid system on the spherical geometry. We performed a benchmark comparison with previous codes with different numerical schemes and confirmed validation of our code. The Yin-Yang grid is suitable to solve the mantle convection problems because we do not need to care the pole problems which may arise in a usual latitude-longitude grid system.