Structure in the core-mantle boundary region inferred from numerical simulations of mantle dynamics

Takashi Nakagawa[1]

[1] Kyushu Univ.

Recent interpretations on the core-mantle boundary region from both seismological and high pressure studies have suggested that the post-perovskite phase boundary would be found benearth the compositional heterogeneities that were segregated from subducted MORB slabs. A key issue on such a suggestion is that the depth of phase transition from perovskite to post-perovskite for MORB-related material is different from that for ambient lowermost mantle. Here, in order to check the validity of a suggestion for the structure in the core-mantle boundary region from both seismological and high pressure studies, numerical simulations of thermo-chemical multiphase mantle convection in a three-dimensional spherical shell are used with different depth of phase transition from perovskite to post-perovskite for olivine (2700km) and pyroxene (2550km) phase change systems. For estimating seismic anomalies from numerical results, the effects of mineral compositions of mantle rocks based on thermodynamics are assumed. Simulation results have suggested that it would be valid for an interpretation of structure in the core-mantle boundary region inferred from both seismological high pressure studies. Moreover, our estimations of amplitude of seismic anomalies would be consistent with observations.