

The 428th Geodynamics Seminar

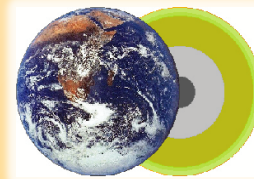
Numerical experiments on mantle convection of super-Earths with variable thermal conductivity and adiabatic compression

Mayumi Yamamoto (Msc. student, Ehime University)

Date: 10.30.2015 (Fri) 16:30 ~

**Venu: Meeting Room #486, Science
Research Bldg 1, Ehime Univ.**

**日時 : 2015年10月30日 (金) 16:30~
場所 : 愛媛大学 総合研究棟 I
4階 共通会議室**



Abstract

We conduct a series of numerical experiments of thermal convection of highly compressible fluid in a two-dimensional rectangular box, in order to elucidate the mantle convection on super-Earths. The thermal conductivity and viscosity are assumed to exponentially depend on depth and temperature, respectively, while the variations in thermodynamic properties (thermal expansivity and reference density) with depth are taken to be relevant for the super-Earths with 10 times the Earth's. Our experiments showed the change in convecting flow patterns depending on the depth-dependence in thermal conductivity and the temperature-dependence in viscosity. This is largely due to the change in the thermal state in the convecting mantle, whose interplay with the adiabatic temperature change in turn reduces the activity of hot plumes from the base of the mantle. In particular, for the cases with strong interplay, we found that a “deep stratosphere” of stable thermal stratification can form at the base of the mantle where the fluid motion is insignificant.

詳細は当センターホームページ: <http://www.grc.ehime-u.ac.jp/> をご覧ください

問い合わせ先: 出倉 春彦 (TEL:089-927-8408, e-mail:dekura.haruhiko.mf@ehime-u.ac.jp)