Geophysical Research Abstracts,
Vol. 11, EGU2009-6704, 2009
EGU General Assembly 2009

Planetary core convection and magnetic stability

S. Starchenko
IZMIRAN, Main Geomagnetic Field, Troitsk, Russian Federation (sstarchenko@mail.ru, 7495 3340124)

The planetary convection and magnetic instabilities driven by thermal or/and compositional power had been investigated in their natural limit of very small transport coefficients.
For the Earth's type planets, the marginal convection instabilities were investigated. For the first time in word practice I succeed to find an analytic semi-steady solution for the case with strong instability concentrated near the inner rigid core of a planet. This could effectively be applied to modern Mercury, while to the Earth, Venus and Mars at the correspondent stage in their evolution.
The strong influence of the inner rigid core size is found on planetary convection instability. The relative size about half of the modern Earth's inner core size makes compositional convection valuable and able on addition magnetic support as in the past Earth or on magnetic appearance possible in future Venus. The inner core growing up to the about half of the convective shell size supports thermal convection and related magnetism. Further growing of the core suppresses the compositional convection which died out when thickness of the shell becomes too small. The last possibly was in the past Mars when its magnetic dynamo has been stopped.
This had been supported by RFBR grants: 06-05-65162.