Thermal evolution of the Earth's core in thermo-chemical evolution system model of deep Earth's interior

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The most important quantity for understanding thermal evolution of the Earth's core is to evaluate the heat flow across the core-mantle boundary. CMB heat flow has been estimated by a scaling law between convective vigor and boundary heat flow derived from thermal boundary layer theory. However, such a theory could just check the consistent scenario for thermal evolution of the Earth's core roughly. That scenario would be big discrepancies from high pressure experiments and first principle calculations of core material. Here thermo-chemical evolution system model of the deep Earth's interior that is coupled between thermo-chemical multiphase mantle convection and core evolution model based on thermodynamics is used to estimate the heat flow across the core-mantle boundary and its influence to the thermal evolution of the Earth's core. As a consequence of modeling by such a model, compositional heterogeneities above the core-mantle boundary that have been suggested from seismological aspects and small amounts of radioactive heat elements in the core that has been also suggested from high pressure experiments are necessary to explain the current size of the inner core and its relatives for thermal history of the Earth's core.