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Effects of a chemically-dense, high internal heating layer at he base of the mantle on the thermal and magnetic histories of the Earth's core

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Recent isotopic studies suggest that a layer of high internal heating exists in D" (*Boyet and Carlson*, 2005, *Tolstikhin and Hofmann*, 2005). In addition, large lenses of post-perovskite phase may exist in the lowermost part of the D" region (Lay et al., 2006), with higher density and K content than the perovskite (*Steinle-Neumann et al*. 2006). Such complexity in the lowermost mantle could have profound effects on the thermal evolution of the core. In this contribution, we present the results of simulations of the thermal evolution of the Earth assuming a 200-km chemically-dense layer with variable degrees of internal heating at the top of the core. The models consist of a spherical 2D axi-symmetrical model for convection in the mantle, underlain by a theoretical layer in which the heat is transferred mainly through conduction (*Lassiter*, 2006). The numerical model of the mantle is coupled to a parameterized model for the thermal evolution of the core. The effects on the cooling history in the core and the age of the inner core are studied through the energy balance of the core. We study the effects of the chemically-dense layer on the magnetic history, by calculating the entropy available for ohmic dissipation in the core, as a proxy for the intensity of a model magnetic dipole field. Finally, we compare our results with a previous analysis in which a similar high internal heating was designed at the base of the mantle (*Costin and Butler*, 2006).