



The impact of crust production on the evolution of terrestrial planets

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Crust production is sometimes estimated in global geodynamics simulations of mantle convection but is often considered to have little impact on the dynamics. We present here a set of studies where crust is formed and is shown to have a first order influence on the convection regime.

We show that basaltic crust production and the style of magmatism (eruptive being opposed to intrusive) have to be considered to fully capture the thermocompositional evolution of terrestrial planets. We show that boundary layer theory can be updated to take crustal thickness and crust recycling into account.

Simulations of mantle convection in which both basaltic and felsic crusts are produced are also presented. Our results have a strong impact on the quest for the onset of plate tectonics as we found a strong decrease in felsic crust production without the onset of plate tectonics.