



ÉCOLE DOCTORALE SCIENCES DE LA TERRE



université
PARIS
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Subject offered for a contract starting in September 2011

SUBJECT TITLE: DYNAMICS OF CRUSTAL DIFFERENTIATION

Advisor: **JAUPART Claude, Professeur, (jaupart@ipgp.fr)**

Second Advisor/ Supervisor:

Host lab/ Team: **Dynamique des Fluides Géologiques - UMR7154
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Financing: Doctoral contract with or without assignment

For more information go to <http://ed109.ipgp.fr>, section: Offres de these (PhD offer), You must apply on the Doctoral School website

Presentation of the subject: (1 or 2 pages)

Continental crust is derived from mantle melts and undergoes internal differentiation leading to rocks of evolved silicic compositions and dense mafic residues. Bulk mass balance calculations indicate that, on average, continental crust has lost a large fraction of its mafic residues. This has been attributed to foundering at the base of the crust or to a Rayleigh-Taylor (R-T) instability developing out of layered crust. In all cases; the efficiency of the mechanism depends on ambient crustal temperatures through its impact on rheology. Chemical differentiation between silicic and mafic end-members also involves separation of radioactive heat sources. Such separation leads to preferential storage of radioactive elements in the upper crust and hence implies a decrease of crustal temperatures. In turn, this leads to strengthening of the lower crust which acts against foundering or R-T instability at the base of the crust.

The proposed research will involve thermal calculations as well as dynamical models of buoyancy-driven processes in the lower crust. The models will be constrained using data on heat flow and heat production in stable crust and also using the few areas on Earth where lower crustal assemblages can be found on the outcrop.