' CRYSTAL2PLATE ' Marie Curie Initial Training Network in Earth Sciences

In the frame of a new research and educational program of the European Community, ***Geosciences Montpellier*** *invites applications of highly motivated individuals for* ***2 PhD*** *positions starting from October 1st, 2009*

Feedback between melt transport, melt segregation, and deformation in the mantle
Supervisors: J.L. Bodinier /A. Tommasi / D. Arcay (UM2) & J. Connolly (ETH ZURICH) Coll. C. Garrido (CSIC); T. Gerya (ETH ZURICH)

This Ph.D. project will couple a petro-structural and geochemical study of mantle rocks (in the field and in the lab) to numerical modeling in the study of the relations between melt transport/segregation and deformation in the mantle. Fine analysis of the microstructures in natural systems with variable melt-rock interactions will be used to constrain the feedback between deformation and melt segregation. The candidae will test, for instance, if the observed gap between ultramafic (olivine-rich) and mafic (pyroxene-rich) compositions does marks a threshold for melt segregation during porous transport in the mantle, by coupling a systematic analysis of compositions and microstructures of fertile lherzolites, layered pyroxenites, and websterites in peridotite massifs to theoretical models of melt transport and segregation in the mantle. The changes in deformation mechanisms and resulting strenght variations in presence of variable melt fractions will be characterized based on the analysis of the microstructures and of the crystal preferred orientations of both fertile and refractory peridotites. The results of these studies will be implemented in geodynamic models to investigate the consequences of this process to the erosion of the subcontinental mantle lithosphere (CRYSTAL2PLATE project 9) and to the dynamics of subduction (CRYSTAL2PLATE project 6) and ridge systems.

How do mantle plumes help to thin and break up the lithosphere?
Supervisors: A. Tommasi/D. Arcay (UM2) & G. Hellfrich (UNIVBRIS)
Coll.: A. Davaille (FAST), G. Barruol (UM2), C. Garrido (CSIC)

The aim of this project is to develop coupled geochemical-petrological and thermo-mechanical numerical models to study the thinning of the lithospheric mantle atop mantle plumes or in extensional environments. The candidate will also investigate the role of the preexisting structure of the lithosphere on the thinning process. Model predictions will be compared to seismological observations in Cape Verde and Polynesia. The feedback between petrological processes and deformation will be constrained based on field observations in peridotite massifs in the Alboran region and in the Pyrenees (CRYSTAL2PLATE Projects 3 & 4). The dynamics of plumes in the convective mantle will be constrained by comparison to laboratory models of mantle plumes developed at the FAST laboratory, Orsay.

Requirements:

- Mobility: Applicants cannot be French or have lived in France for more than 12 moths in the last 3 years
- Applicants must have strong quantitative skills, hold a degree in geosciences, physics or related subject, and be highly motivated to work in an international team.
- At the time of selection for this position, applicants must be in the first four years (full-time equivalent) of their research career. This is measured from the date of award of the degree that entitles the applicant to embark on a doctorate (Master degree).
- Applicants must have excellent written and spoken English

Employment conditions:

- Full employment contract with social security
- Net monthly salary €1900 (correction for family status at the time of recruitment)
- Yearly travel allowance of €250-1000 (fixed amount that depends on the distance between the country of origin and the host institution)
- A career exploratory allowance of €2000 (single payment)
- Guaranteed funding for the research project and training activities
- Each ESR and ER will have a personalised training program mutually agreed on recruitment, which will directly reflect his/her personal training needs and career objectives.
- Participation in an EU-funded international research and training network composed by 7 major research groups in geodynamics

Application Procedure

- Candidates should apply via our **online application procedure** (http://www.gm.univ-montp2.fr/CRYSTAL2PLATE/jobs.html). Once the application is received, they will receive an email asking for their CV and academic credentials (mark sheets and degree statements).

A complete description of all CRYSTAL2PLATE positions and training program, deadlines, and online application forms can be found at:
http://www.gm.univ-montp2.fr/CRYSTAL2PLATE/home.html

For additional informations please mail us @ crystal2plate@gm.univ-montp2.fr