



Charles University in Prague

Faculty of Science

Division of Geology

POSTDOCTORAL FELLOW POSITION AVAILABLE IN

**Migration of low-fraction melts and fluids in seismically active regions:
numerical simulation and mechanical consequences of reactive flow**

Magma-derived fluids are considered to be a possible triggering mechanism of earthquake sequences. Various geodynamic settings are characterized by recurrent seismic activity that occurs in coincidence with abundant fluid degassing. This is also the case of West Bohemia/Vogtland earthquake swarms that suggest causal relationship to the formation of high-pressure fluids in the lithosphere. Current models, however, do not account for the effects of volume changes or phase transformations such as boiling or immiscibility, while these are associated with the largest mechanical energy release.

The postdoctoral project will concentrate on the seismogenic effect of low-fraction intergranular partial melts or aqueous-carbonic fluids, which represent the main factors responsible for hydraulic weakening of high permeability zones in the continental lithosphere. It will target the causal links between the fluid and melt migration, their mechanical and rheological consequences for initiation of mechanical instabilities, that is the seismic activity. In particular, the feedback relationships between reactive fluid flow, porosity formation and destruction, and mechanical consequences of fluid expansion and separation will be investigated in detail. The postdoctoral fellow will be responsible for: (1) the implementation of pressure-volume-temperature equations of state for aqueous-carbonic fluids applicable to high temperatures and pressures, and algorithm development for equilibrium partitioning in two-phase mixtures, pressure changes and tension effects; (2) the preparation of the two-dimensional hydrodynamic model for porous and fractured media and (3) application of the model to the seismicity of West Bohemia/Vogtland earthquake swarms. This project is expected to contribute to our understanding of seismicity triggering in the presence of two-phase fluids in the fractured lithosphere and various geodynamic settings, and the successful applicant will become part of a vibrant scientific team bridging two areas of geosciences at the Faculty of Science, Charles University in Prague and involving additional international collaborators.

The position is funded from January 1, 2014 or later for two years. Applications will be reviewed on incoming basis and the selection procedure will close on September 3, 2013.

Contact persons

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