



PhD student opportunity at BRGM, Orléans, France

The Risk Division of BRGM (French Geological Survey, Orléans, France) seeks highly motivated applicants for a 3-year-PhD student opportunity starting from late 2012 within the framework of the European project **NEMOH: Numerical, Experimental and stochastic Modelling of volcanic processes and Hazard: an Initial Training Network for the next generation of European volcanologists** (FP7-PEOPLE-2011-ITN Marie-Curie action). The student is expected to work for the objective to improve our understanding of **“the source and structural properties of volcanoes from the advanced numerical modeling and integration of field data”**.

These structural and dynamic properties of volcanoes are commonly determined by geophysical inversion techniques using seismologic and/or geodetic data. These data can then be inverted to back compute the source process and/or the velocity structure of volcanoes. However, most inversions for volcanic systems assume simple homogeneous media and point-source models that could lead to a misunderstanding of the eruption processes. We aim at investigating the influence of the complexity of the source and velocity structure on static (e.g. permanent surface deformations) and dynamic responses (e.g. generated wave-field) of volcanoes during an eruption and other stages of the volcanic cycle. To this end, advanced three-dimensional numerical techniques such as the spectral-element method will be used to compute surface deformation and wave-field generated from finite-size source in complex media with strong velocity gradient and surface topography. Complex volcano models will be applied on two or three sites with known velocity structure and sources according to the interests of the NEMOH network, and the new results will be compared with existing established models.

Applicants should have a M. Sc. or equivalent diploma in geoscience, physics, applied mechanics, engineering or a related field, but the eligibility rule imposed by the FP7-ITN call is applied, in particular, *at the time of recruitment by the host organisation, researchers must not have resided or carried out their main activity (work, studies, etc) in the country of their host organisation for more than 12 months in the 3 years immediately prior to the reference date*. Further information is found on <http://cordis.europa.eu/fp7/>. Solid understanding and interest in numerical models for wave propagation and/or deformation process, strong analytical skills, programming and visualization (Matlab, Fortran, UNIX), communication skills (Firstly English. French language is practically useful), and readiness to work in an international and multidisciplinary team are essential for the position. Successful candidate will register at the “Institut des Science de la Terre d’Orléans”, which is part of the University of Orléans (France).

Applicants should submit, by e-mail, an application letter, curriculum vitae, highest degree certificate, short statement of research interests, names and addresses of three references to nemoh@brgm.fr. Only complete application will be considered. The selection process starts from the 15th of June 2012 and will continue until the position is filled. For more information, please contact Dr. Hideo Aochi (email: h.aochi@brgm.fr).

Note: see Appendix for more details about NEMOH project.

Appendix: NEMOH project description (<http://www.nemoh-itn.eu/>)

Volcanic eruptions, and associated hazards, are a constant concern for many European countries and for Europe as a whole. During last decades, disciplines like thermodynamics, fluid dynamics, structural mechanics, and advanced experiments and computation, have been incorporated in volcano science, and formalized treatment of uncertainties has become a prominent means of volcanic hazard evaluation. This has developed volcanology to the level of a multidisciplinary, quantitative branch of the Earth Sciences. However, critically, such developments have not been accompanied by a comparable evolution of the curricula of students and young scientists undertaking a career in volcanology.

The training objective of the NEMOH consortium is that of forming the next generation of European volcanologists, capable of extending further the knowledge and understanding of volcano dynamics and the methods and paradigms for volcanic hazard evaluation. Research Training is conceived to develop in the context of top level, internationally coordinated research structured in closely interconnected WorkPackages. A distinctive feature of RT within NEMOH is the merging of deterministic and probabilistic approaches in volcanic hazard evaluation, a crucial objective of modern volcanology.

Nine Full Network Partners plus 4 Associated Partners (including 2 SMEs and 1 Governmental Civil Protection Department) compose the NEMOH Consortium. Training is developed through interrelated local and network-wide activities, and is extended to 22 ESRs for a total of 648 research months. Four Visiting Scientists (total of 5 months) complement the staff of trainers within NEMOH. Four Network RT Schools (the last one associated with a 3-days Final Conference), and two special sessions at the EGU General Assemblies in year 3 and 4, represent topical activities within NEMOH. Organization and management includes 9 meetings of the Supervisory Board during the 4 years of the Network. The starting date is the 1st January 2012.