

Proposed Studentship



Uniting Brittle and Ductile Deformation in Extensional Basins

Supervisors: Jason Morgan, Robert Hall

Project Description:

The Earth has an amazingly flexible rheology, with brittle fault-like deformation predominating near the surface, and ductile deformation dominating in hotter deeper rocks. Fault zones are thought to deform by brittle and ductile modes of deformation occurring at different spatial locations within the deforming lithosphere. Typically, numerical modelling studies of extension processes have used techniques that work well for idealizing brittle deformation (e.g. discrete element techniques), or ductile deformation (e.g. finite element techniques), but not both simultaneously.

This project will involve the development of a 2D numerical model that simultaneously includes both discrete element and finite element subdomains. To test this hybrid deformation code we will compare its predictions for the evolution of an extensional basinal system with previous analogue experiments and numerical models. Coding will be done using MATLAB and parallel-MATLAB, which allows us to combine these new deformation codetools with previous finite element codetools developed to model heat transport and melting processes. The resulting code will be used to model the evolution of extensional processes in one or more basins associated with Indonesian back-arc and within-arc regions that are currently being explored by the SE Asia Research Group.

The student will join a large and active research group working in SE Asia based at Royal Holloway, and will interact with other students involved in field studies as well as numerical and analogue models of rift dynamics.

This project is one of several PhD studentships open to UK/EC students proposed for funding in 2014. The exact number of studentships to be supported is not yet certain but those selected will be fully funded by the SE Asia Research Group (<http://searg.rhul.ac.uk/>).

Please contact the Postgraduate Programmes Co-ordinator, if you have additional questions about the department or application procedures (email: pgadmin@es.rhul.ac.uk; fax: 01784-471780; tel: 01784-443581).

An application form can be found here www.rhul.ac.uk/studyhere/postgraduate/applying. Applicants are requested to send an additional copy of their CV directly to the lead supervisor of the project in which they are interested. Please also contact the supervisor if you have any questions about the project itself.