



Cracking Continents: The China Syndrome

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One of the persistent enigmas of Plate Tectonics is why the old (>2.5Ga), cold, stable, viscous cratonic lithosphere sometimes rifts, but most of the time does not. Recent suggestions include erosion by mantle-derived hydrous melts, back-arc extension, delamination etc. Here we plan to review and study the cracking of continents by considering two different aspects of this problem: (1) Continental Rifting including the origin of failed rifts and continent-scale diking events such as the McKenzie Dike Swarm and the long-term evolution of the East African Rift; (2) Continental thinning including the recent (<200Ma) loss of the North China Cratonic lithosphere.

This project will combine an observational geophysical and petrological examination of these two types of geologic events with simple model explorations of (a) the effects of stresses associated with rift volcanism as well as (b) the intrusion and freezing of carbonatitic plume melts within cratonic lithosphere. Stresses will first be estimated with simple analytical parameterizations, and later with axisymmetric 2-D and 3-D numerical experiments.

Particular goals of this investigation are (1) to develop model scenarios that let us better understand how and why the North China Craton thinned when it did, and (2) to understand why there is often a ~20Ma or longer hiatus between rifting and breakup of Gondwana margins, and to (3) to define mechanisms of craton destruction.

The student must have an interest in the integration of geophysical and geological data in solving problems in earth science. The student will interact with academic staff at Royal Holloway and in China and with other students involved in numerical and analogue models of rift dynamics.

How to Apply:

Please use the **online application system**

(<http://www.rhul.ac.uk/studyhere/postgraduate/applying/home.aspx>) to submit an application for this project. Applications will require 2 letters of reference, plus a cover letter and CV- applicants are also requested to email a copy of their CV directly to the lead supervisor of this project (j.morgan@rhul.ac.uk). **Please ensure you complete your application by mid-December. Suitable candidates will be invited for interviews, which will take place in February/March, and offers are made by the end of March.**

For any queries please contact the Postgraduate Programmes Co-ordinator (email: pgadmin@es.rhul.ac.uk or tel: 01784-443581) and further information can also be found on the Department's Website (<http://www.rhul.ac.uk/earthsciences/home.aspx>).