

Proposed Studentship

The Origin of Coal: unravelling the effects of climate, sea-level and vegetation on Pennsylvanian landscape evolution

Supervisor: Dr Howard Falcon-Lang

Project Description:

During Pennsylvanian times, Europe and North America lay at low latitudes and were covered by steamy coal-forming rainforest. Coal-bearing strata typically show distinct sedimentary cycles, which are attributed to synchronous changes in climate and sea level. These, in turn, probably reflect the effects of Milankovitch-driven glacial-interglacial cycles on coastal environments.

Despite their economic importance and over two centuries of study, fundamental questions about the origin of Pennsylvanian coal-bearing strata remain hotly debated. What was the amplitude of the sea level fluctuations, and how did this change through Pennsylvanian times? Did economic coals mostly form at sea-level lowstand, during transgression, or at highstand? Are coals chronostratigraphic surfaces or are they time-transgressive? How was it possible for coal-forming wetlands to establish over continuous areas as great as 100,000 km²? How did tropical vegetation respond to glacial-interglacial cycles?

In this project, the student will address these questions through analysis of the palaeontology, sedimentary facies and sequence stratigraphy of the UK Pennsylvanian. This will allow the effects of sea level, climate, vegetation, and geography to be disentangled and shed light on the origin of coal. This work forms part of a larger project dealing with the Pennsylvanian climate change involving a team of leading international sedimentologists, stratigraphers, geochemists, and palaeontologists. It therefore represents an exciting opportunity to collaborate and address significant multidisciplinary questions.

The student will be encouraged to publish results in high-impact journals such as *Geology* and disseminate findings through the media. The project will include full training in sedimentary facies analysis, sequence stratigraphy, coal geology, and science communication. The project would suit applicants interested in building careers in the hydrocarbon exploration or academia.

References:

- FALCON-LANG, H.J., NELSON, J., LOOY, C., AMES, P., ELRICK, S. & DIMICHELE, W.A. 2009. Incised channel-fills containing conifers imply that seasonally-dry vegetation dominated Pennsylvanian tropical lowlands. *Geology* 37: 923–92
- SAHNEY, S., BENTON, M.J. & FALCON-LANG, H.J. 2010. Rainforest collapse triggered Pennsylvanian tetrapod diversification in Euramerica. *Geology* 38 (12), 1079-1082.

Potential funding:

We currently have a vacant NERC studentship available for the **2013 academic session** following a withdrawal of a previous student, which has a maximum funding of 3 years. The NERC studentship will be awarded to the best candidate over a range of PhD topics on offer.

Eligibility:

Eligibility for this studentship is restricted to UK citizens and applicants who have been ordinarily resident in the UK throughout the 3-year period preceding the date of application for an award, and has settled status in the UK within the meaning of the Immigration Act 1971 (i.e. is not subject to any restriction on the period for which he/she may stay). Further information can be found from the National Environmental Research council website <http://www.nerc.ac.uk/funding/eligibility.asp>.

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 should include 2 letters of reference, a cover letter and CV- applicants are also requested to email a copy of their CV directly to the lead supervisor of this project. Please ensure you complete your application **by Friday 23rd August 2013**.

Interviews will be in the week commencing 2nd September (most likely the 2nd or 3rd) and offers will be made soon after.

For administrative queries please email info@es.rhul.ac.uk and for project queries, contact the Lead Supervisor- staff contact details will be on the website:

<http://www.rhul.ac.uk/earthsciences/staffdirectory/home.aspx>