

## **Gill Harwood Memorial Fund Application**

### *The Evolution of the Northern Gondwana Passive Margin: a chronostratigraphical perspective*

#### **Background**

I am a full-time first year Ph.D. student, supervised by Prof. Graham Williams and Dr. Michael Montenari within the Department of Earth Sciences at Keele University. My research is currently focused on developing a detailed sedimentological, stratigraphical and structural history of the Cantabrian Zone within the Iberian Massif in Palaeozoic, NW-Spain. Specifically, my work seeks to develop models of burial history and chronostratigraphy in an extensional (passive margin) setting for the Rheic Ocean (Late Cambrian to Early Silurian) and rifting in the Rheno-Hercynian Ocean (Devonian) development.

My current research on the Palaeozoic stratigraphic successions and structures provides a unique insight into the basin dynamics and palaeogeography of the peri-Gondwana micro-terranes. Interpretation of the data collected from future field seasons will be used to create a chronostratigraphic basin model that will enhance the understanding of the evolution of this part of Northern Gondwana area.

The geology of the Iberian Massif has been examined for decades. However, much of the literature discusses Cantabria in the context of the Variscan Orogeny and the palaeogeography of Northern Gondwanaland. To the best of my knowledge little consideration has been put upon the extensional (passive margin) and the development of the Rheic and Rheno-Hercynian Oceans.

My Ph.D. project in the Cantabrian Mountains in NW-Spain provides an excellent opportunity to compare and contrast two passive margin extensional systems within well-exposed outcrops within the geological paradigm. Furthermore, it is my intention to use the data and analysis from this upcoming field season for my first paper publication.

I believe that field investigations are critical to the progression of geosciences. A much greater level of subject understanding can be generated in the field and complement desk-based information. Personally one of the main influences in undertaking a Ph.D was to develop my fieldwork skills independently in the hope of gaining fieldwork confidence and improving my pragmatic and practical skills. Therefore, if I were to gain any funding to prolong my field season from the BSRG Gill Harwood Memorial fund it would aid my personal development within geology greatly.

#### **Current Fieldwork**

In September 2009 I undertook an initial phase of field data collection in Cantabria, NE-Spain. This period of research was used to acquire first-hand understanding of the dynamic sedimentology, structures and varying palaeontology of the Rheic passive margin environment. Sedimentary thicknesses and structural styles were examined within the Ordovician to Silurian strata. Structural, specifically extensional faulting information was gathered for this time period during the field visit.

The results of this initial phase of field data collection combined with recent desk-based data analysis have enabled the construction of correlation panels, burial history diagrams and a chronostratigraphic panel. The development of a preliminary basin analysis from a limited field visit has proved invaluable for the understanding of the basin environment during the extension of the Rheic Ocean and has permitted the planning of future field data collection.

#### **Future Fieldwork**

It is my intention to conduct a second period of field data collection in Cantabria during June and July of 2010. Data collection is required to cement knowledge and understanding of the passive

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margin during the development of both the Rheic and Rheno-Hercynian Oceans. Fieldwork underpins the future of the research project forming the basis for future basin modeling.

Data to be collected includes:

- Sedimentary logs of key syn-rift and post-rift sequences
- Paleontological samples for transitional rift zones
- Burial history samples - for a zircon/apatite fission track pilot study
- Structural orientation data for balanced cross-Sections and palaeogeographic reconstructions

### **Breakdown of Funding Requested**

<b>Item</b>	<b>Source</b>	<b>Cost</b>
Airfare to Spain	NERC Funded	£200
One week car rental (including petrol)	NERC Funded	£135
Three weeks car rental (including petrol)	Funding Required	£400
Accommodation (1 week)	NERC Funded	£110
Accommodation (3 Weeks)	Funding Required	£330
Subsistence (4 week)	Self Funded	£250

**Amount requested from BSRG Gill Harwood Memorial Fund: £730 (any amount towards this cost would be gratefully received)**