

BSRG postgraduate student funding request: Miss Samantha Ilott (University of Plymouth)

Financial request for: trench excavation for sampling for cosmogenic isotope dating

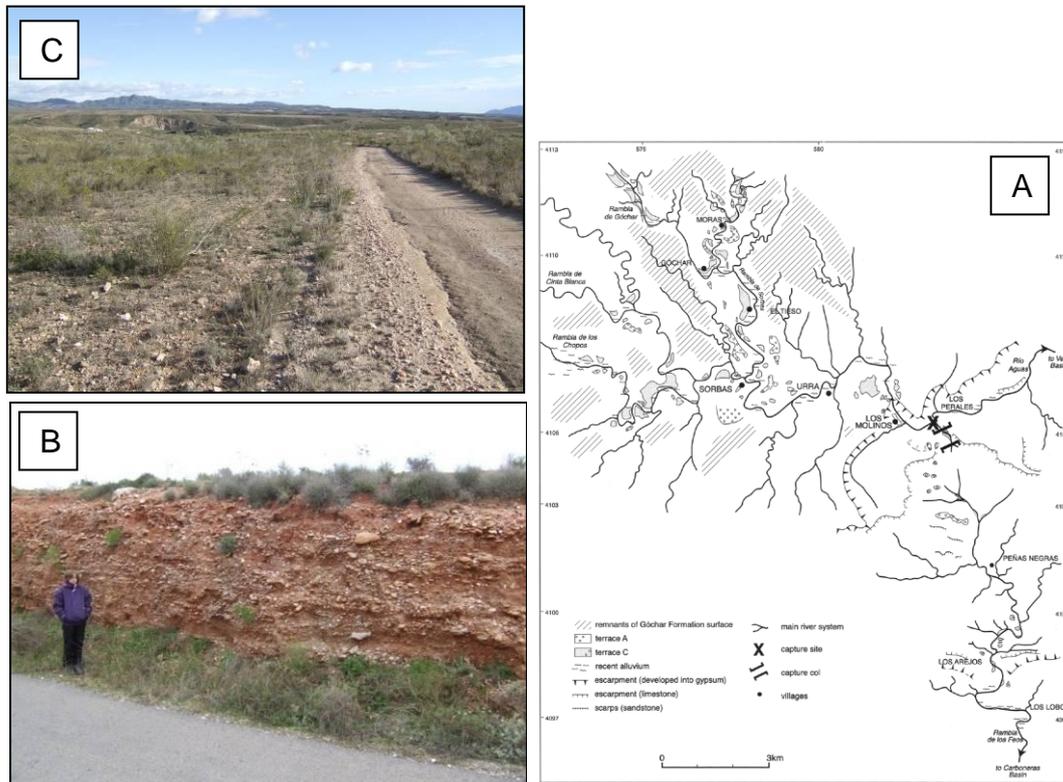
My PhD involves applying cosmogenic isotope dating (see Gosse and Philips, 2001) to some Quaternary river deposits in the Sorbas Basin of SE Spain. The terrace deposits record the fluvial response to regional uplift patterns, collectively a product of the collision between the African and Iberian plates.

During uplift and fluvial incision a major basin scale river capture event took place with the Río Aguas capturing the headwaters of the Río Alias. The Sorbas basin was uplifted at a higher rate than the surrounding basins (e.g. Stokes, 2008) leading to headward erosion of the Río Aguas allowing it to capture the Río Alias and Rambla de los Féos. The Río Aguas experienced an increase in stream power created by a base level drop of ~90m leading to increased incision. The incision is recorded in 5 major terrace levels (G, A-D) (Fig. A) with terrace G being the top surface of the original basin fill and terrace D being the youngest terrace surface (Harvey & Wells, 1987).

The river terrace deposits consist of coarse gravel sediments (Fig. B) which are throughout the Río Aguas catchment and Sorbas Basin. The terraces can be up to 20 m in thickness and are capped by calcretes. The age control for dating the terraces is poor, currently relying on U-Series dating of pedogenic soils that cap river terrace landforms (Candy *et al*, 2005, 2004, Kelly *et al*, 2000). The soil is younger than the terraces themselves and by applying cosmogenic dating, I hope to better constrain the chronology of the terraces.

I will be applying a hitherto little used profiling technique (Anderson *et al*, 1996, Hancock *et al*, 1999, Repka *et al*, 1997) to date the river terrace deposits in order to provide field data that will enable modelling of rates, magnitudes and directions of fluvial incision related to uplift and the capture event. The reason for using this technique is that it enables older, pre-Late Quaternary terrace levels/surfaces, including the top basin fill surface to be dated. The profiling technique requires at least 2 meters of the terrace to be exposed in a man-made cut (e.g. road cut, quarry, etc). Eight samples, consisting of quartz pebbles $\sim >2\text{cm}$ in diameter, will be taken approximately every 0.2m which will then be amalgamated into one sample during the laboratory work (Anderson *et al*, 1996).

A field reconnaissance in December 2008 identified some suitable sites for sampling 1) the Góchar Formation top basin fill surface and 2) the river terrace incision record into the basin fill sediments (Terraces A, B, and D). However, we are lacking a suitable (& critical for the river capture story) man-made section to sample from Terrace C. Terrace level C is extensive throughout the Río Aguas catchment (Fig. A) but has only natural river valley side sections. A solution is to excavate a hole using appropriate machinery (e.g. JCB). We have identified a suitable site (Latitude $37^{\circ} 5'48.71''\text{N}$ Longitude $2^{\circ} 5'6.32''\text{W}$: Fig. C) and have permission off the landowner and Medio Ambiente of the Andalucian government to excavate such a hole. I am therefore requesting some small financial support from BSRG to pay for a JCB to dig a 2.5m deep hole through a calcreted terrace surface and through some coarse grained (gravel-pebble size) in order to undertake my sampling for this critical age. NERC funds are only approved to support fieldwork travel and subsistence and for the cost of the analytical work. A quote of £350 was provided to hire suitable digging machinery for approximately one day, which is considered suitable time to dig, sample and refill the excavation.



Figures

- A: Map of Sorbas Basin showing river capture site and key landform levels (Stokes et al, 2002).
 B: Example of road section through terrace B suitable for sampling for cosmogenic dating.
 C: Proposed terrace C sampling site where excavation needs to be undertaken.

References

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