



## What caused Mongolian Mesozoic Magmatism: was it crustal or mantle driven?

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The Mesozoic was a time of anomalous widespread extension <sup>[1]</sup> across southern and eastern Mongolia producing Basin-and-Range type topography in eastern Mongolia and China <sup>[2]</sup>. This extension occurred after a major collisional event associated with the closure of the Mongol-Okhotsk ocean. Accompanying this phase of extension are large abundances of basin-infilling basalts which have had a number of models proposed to explain their genesis. The diversity of these models include: (1) a mantle plume <sup>[3]</sup>; (2) delamination <sup>[4]</sup>; (3) post-orogenic collapse <sup>[5]</sup>; (4) back-arc extension due to the collapse of a subducted slab and (5) mantle upwelling initiated by mantle avalanches <sup>[6]</sup>.

This study aims to assess the plausibility of these models by constraining the mechanisms for magma genesis by combining geochemical evidence with field and age relations. Then, using these constraints, we will test local and regional tectonic syntheses.

To date, we have collected a large suite of samples from the western limit of volcanism, the Gobi, Mongolia. Samples have been analysed for major, trace and REE elements (XRF & ICP-MS) and Sr-Nd-Pb isotope data, with results showing the basalts are LREE enriched (high La/Ti) and slightly HREE depleted. The chemistry and limited isotope data suggests fractionation and crustal contamination processes likely played a role in the formation of these lavas. Furthermore, modelling has been done to constrain the amount of partial melting and to help explain the HREE depletion. It is hoped that further sampling and modelling will help to constrain the processes responsible for melt generation.

[1] Lister and Davis 1989. *Struct. Geol.* 11, 65-94. [2] Graham et al., 2012. *Phanerozoic Rift Basins and Sedimentary Basins*. 17, 443-461. [3] Yarmolyuk and Koalenko 2001. *Tectonics, magmatism and metallogeny of Mongolia*, London. [4] Tomurtugoo et al., 2005. *Jour Geol Soc* 162, 125-134. [5] Fan et al., 2005. *Geo Res.* 121, 115-135. [6] Bat Ulzii et al., 2013. *Gondwana Research*