

**AN ANISOTROPY OF MAGNETIC SUSCEPTIBILITY  
STUDY OF THE STAC FADA MEMBER SUEVITE:  
CONSTRAINTS ON THE IMPACT CRATER LOCATION**

K. Amor, J. Taylor, S. P. Hesselbo and C. MacNiocaill. Department of Earth Sciences, University of Oxford, Parks Road, Oxford, OX1 3PR. E-mail: kena@earth.ox.ac.uk.

The Stac Fada Member (SFM) of the 1.177Ga [1] Stoer Group sediments (NW Scotland) has recently been reinterpreted as a proximal ejecta blanket [2]. Field observations of suevite injected between bedding planes of the underlying sandstones suggest a strong component of lateral movement during ejecta emplacement, consistent with the notion of fluidized deposition by surge-type flows rather than simple ballistic sedimentation. If this is the case then the ejecta may be expected to retain a fabric or lineation indicative of flow direction, which when measured at several dispersed geographical locations may point towards the impact crater. Anisotropy of magnetic susceptibility (AMS) has been used to determine directional information in geological materials subjected to flow or stress.

We measured the AMS and frequency dependence of susceptibility of 99 cores taken from 20 oriented blocks at 4 locations in the SFM in NW Scotland. All locations show an increasing frequency dependence of susceptibility towards the top of the deposit indicating an increasing proportion of fine-grained magnetic particles, which is consistent with an ejecta blanket origin. A weak anisotropy was detected of 1-2%, which is also a characteristic of pyroclastic flow deposits. The data shows a lineation radiating away from a common center. Coupled with observations of other directional field data which is in good agreement with the AMS lineations, we are able to propose a location for the impact crater in the middle of the North Minch Basin between Stornoway and the Stoer Peninsula.

**References:** [1] Parnell J. et al. 2011, *Journal of the Geological Society* 168:349–358. [2] Amor K. et al. 2008 *Geology* 36:303–306.