

## **Sedimentary recycling in the Millstone Grit, Yorkshire**

P.J. Lancaster (penelope.lancaster@ucd.ie), S. Tyrrell and J.S. Daly

*UCD School of Geological Sciences, University College Dublin*

Sedimentary rocks and modern sediments sample wide areas of the crust, which preserve units that vary greatly in age and composition. Determining the provenance of component minerals is complicated by the ability of some minerals to be recycled through multiple sedimentary cycles, so minerals from completely unrelated sources may end up in the same sedimentary basin. To untangle these multi-stage signals, two or more chemical signatures measured in minerals with different structural stability are required. For instance, feldspars can break down rapidly during sedimentary transport, while zircons can be much more resilient and survive repeated recycling.

One sedimentary succession suitable for testing this hypothesis is the Upper Carboniferous Millstone Grit Group, a fluvio-deltaic sequence of upward-coarsening mudstones, siltstones and sandstones deposited in the Pennine Basin of northern England. New data from throughout this sequence clearly indicate two main feldspar populations, consistent with previous work, but also a minor third group which may correlate with zircons previously thought to be multi-cycle. Since the suggested source region for these rocks is northwest Scotland and the Southern Uplands, which contain material from as far away as Greenland, these data have significant implications for transport distances of both labile and resistant minerals.