



## **Linking glacial melting to Late Quaternary sedimentation in climatically sensitive mountainous catchments of the Mount Chelmos complex, Kalavryta, southern Greece**

Richard Pope (1) and Philip Hughes (2)

(1) Derby, Geography & Earth Systems Science, Derby, United Kingdom (r.j.pope@derby.ac.uk), (2) Quaternary Environments and Geoarchaeology Research Group, School of Environment, Education and Development, The University of Manchester, Manchester M13 9PL, UNITED KINGDOM

Compared to the mountainous areas of northern Greece (e.g. Woodward et al., 2008), the influence of deglaciation cycles on sedimentation in mountainous catchments in southern Greece remains poorly understood due to the poor preservation of small moraines and limited opportunities to date glacial and fluvial sediment dynamics fluvial sediments (Pope, unpublished data). Nevertheless, intriguing new insight into links between glacial cycles and sediment transfer/deposition phases in upland catchments have emerged by applying multiple dating techniques to well-preserved multiple generations of moraines and extensive glacio-fluvial fan systems on Mount Chelmos (2355 m a.s.l.). U-series dating of calcites within proximal fan sediments constrain the earliest phase of glacio-fluvial sedimentation to 490 ( $\pm 21.0$ ) ka (MIS 12), while OSL dating of fine sands constrains the deposition of extensive medial glacio-fluvial gravels in (valley we walked down through trees) to between 250.99 ( $\pm 20.67$ ) and 160.82 ( $\pm 11.08$ ) ka. By comparison, cosmogenic dating of moraine boulders indicates that three generations of well-preserved moraines in the highest cirque areas date to 31-23 ka, 17-16 ka and 12-11.5 ka. OSL dating also provides ages of 18 and 17 ( $\pm 11.08$ ) for an extensive glacio-fluvial terrace in a major valley draining the southern flank of Mount Chelmos. The initial Mount Chelmos geochronology suggests that the earliest and middle phases of glacio-fluvial sedimentation are coincident with the Middle Pleistocene glacial stages recorded in the Pindus range (Hughes et al, 2006). These include the Skamnellian (MIS 12) and the Vlasian (MIS 6) Stages as well as other cold stage between these (e.g. MIS 8). Evidence of glacio-fluvial outwash in MIS 8 is interesting since evidence for this in the moraine records has remained elusive although is suggested further north in the Balkans (Hughes et al., 2011). The valley moraines and glacio-fluvial terraces (late MIS 2) post-date the local last glacial maximum and are coeval with the later part of the Tymphian stage in the Pindus range.

Refs:

Hughes, P.D., Woodward, J.C., Gibbard, P.L., Macklin, M.G., Gilmour, M.A. & Smith G.R. (2006) The glacial history of the Pindus Mountains, Greece. *Journal of Geology* 114, 413-434.

Hughes, P.D., Woodward, J.C., van Calsteren, P.C. and Thomas, L.E. (2011) The Glacial History of The Dinaric Alps, Montenegro. *Quaternary Science Reviews* 30, 3393-3412.

Woodward, J.C., Hamlin, R.H.B., Macklin, M.G., Hughes, P.D. & Lewin, J. (2008) Pleistocene catchment dynamics in the Mediterranean: glaciation, fluvial geomorphology and the slackwater sediment record. *Geomorphology* 101, 44-67.