



Anthropogenic triggers for Late Holocene soil erosion in the Jebel Toubkal, High Atlas, Morocco

William Fletcher and Philip Hughes

Quaternary Environments and Geoarchaeology, Geography, School of Environment, Education and Development, The University of Manchester, Manchester, UK (will.fletcher@manchester.ac.uk)

The Assif n'Imserdane valley, located in the Jebel Toubkal area of the High Atlas, Morocco, is a highly dynamic geomorphological setting. The valley was glaciated during the Late Pleistocene, and subsequently experienced a catastrophic rock avalanche leading to the formation of one of the largest mass movement landforms in North Africa. Recent research (Hughes et al., GSA Bulletin 126: 1093-1104) has dated the formation of the rock avalanche to the mid-Holocene at 4.5 ± 0.5 ka. Here, we examine the sedimentological (organic matter content, magnetic susceptibility, particle size and XRF) and palaeoecological (pollen and spores, non-pollen palynomorphs (NPPs), microcharcoal and conifer tracheid fragments) record of a small infilled basin located adjacent to a Late Pleistocene moraine and close to the rock avalanche in the Arround sector. The deposits, primarily fine-grained and minerogenic with a low concentration of organic microfossils including pollen, coprophilous ascospores, wood and charcoal microfragments, are enriched in fine silts and ferrimagnetic minerals, consistent with erosional sources from surrounding slope soils. Two radiocarbon dates on fine charcoal recovered from the deposit indicate that the infill event occurred during the first millennium AD (after 430 - 640 AD). As such, the deposits point to a phase of slope instability and erosion that is not linked to either deglaciation processes or to the mid-Holocene rock avalanche. Instead, the nature and timing suggest that an anthropogenic trigger of degradation to the natural vegetation cover may be implicated. The record casts light on a previously undocumented phase of landscape instability in the dynamic setting of the Assif n'Imserdane valley, and highlights the potential for further exploration of small infilled basins in the High Atlas to illuminate the geoecological history of this semi-arid mountain region.