Geophysical Research Abstracts
Vol. 18, EGU2016-17137, 2016
EGU General Assembly 2016

Younger Dryas glaciers in the High Atlas, Morocco

Philip Hughes (1) and David Fink (2)

(1) The University of Manchester, School of Environment and Development, Manchester, United Kingdom (philip.hughes@manchester.ac.uk), (2) Australian Nuclear Science and Technology Organisation (ANSTO), Australia (fink@ansto.gov.au)

Twelve cirque glaciers formed during the Younger Dryas on the mountains of Aksoual (3912 m a.s.l.) and Adrar el Hajj (3129 m a.s.l.) in the Marrakesh High Atlas. Moraines in two separate cirques on these mountains have been dated using 10Be and 36Cl exposure dating. In both cirques the age scatter is relatively small (13.8-10.1 ka) and all ages overlap within error with the Younger Dryas (12.9-11.7 ka). The glaciers were small and covered <2 km2 and formed on north-facing slopes. However, the altitudinal range of the glaciers was very large, with equilibrium line altitudes (ELAs) ranging from 2470 and 3560 m. This large range is attributed to local topoclimatic factors with the lowest glacier (confirmed as Younger Dryas in age by 3 exposure ages) occupying a very steep cirque floor where a combination of steep glacier gradient and a large potential avalanche catchment enabled its low-lying position. This indicates that caution should be taken when using single glacier sites for reconstructing regional palaeoclimate, especially those formed in steep catchments that have strong topoclimatic controls. The average ELA of the twelve Younger Dryas glaciers was c. 3109 m a.s.l. (St Dev = 325 m) and this represents an ELA depression of > 1000 m from the modern theoretical regional ELA. Under precipitation values similar to today this would require a mean annual temperature depression of 9°C. Moreover, the glacier-climate modelling indicates that it is very unlikely that climate was drier than today during the Younger Dryas in the Marrakesh High Atlas.