Geophysical Research Abstracts
Vol. 16, EGU2014-1105, 2014
EGU General Assembly 2014

Topographic controls on moraine distribution

Iestyn Barr (1) and Harold Lovell (2,3)

(1) Queen's University Belfast, United Kingdom (i.barr@qub.ac.uk), (2) School of Geography, Queen Mary University of London, UK (h.lovell@qmul.ac.uk), (3) Department of Geology, The University Centre in Svalbard (UNIS), Norway

Ice-marginal moraines are a foundation of our understanding of the extent and fluctuations of palaeoglaciers, and are often used as indirect proxies for palaeoclimate; this link is based on the assumption that moraine distribution is palaeoclimatically-controlled. Here, we use a dataset of ~8,500 ice-marginal moraines to assess the role played by topography in regulating their distribution, and challenge the assumption that moraines can be readily used as indirect proxies for palaeoclimate. We find evidence that topography plays an important role in moraine formation, preservation and ease of identification. At a global scale, this is reflected by 'erosional feedback', which leads to the gradual reduction in ice extent over successive glacial cycles, and the preservation of detailed moraine records. At a regional scale (e.g. the scale of individual mountain massifs), erosional feedback remains important, but other factors, such as the propensity for moraines to form at topographic 'pinning points', are also significant. At a local scale (e.g. for cirque-type glaciers), erosional feedback is less significant, but factors such as physical barriers to ice flow are important. We conclude by suggesting that: (i) palaeoclimatic significance should not automatically be attached to moraine positions; (ii) chronologically grouping (or correlating) moraines on the basis of their geospatial distribution should be undertaken with caution; (iii) where possible, topographic factors should be taken into consideration when using moraines to reconstruct the dimensions of palaeoglaciers, particularly when making links to palaeoclimate.