Geophysical Research Abstracts,
Vol. 11, EGU2009-3419, 2009
EGU General Assembly 2009


# Climate change impacts on sensitive mountain landscapes

J. Knight and S. Harrison

Department of Geography, University of Exeter, Cornwall Campus, Penryn, TR10 9EZ, UK (j.knight@exeter.ac.uk, stephan.harrison@exeter.ac.uk)

Mountain landscapes are climatically sensitive because glacial, periglacial, river and ecosystems in these areas respond dynamically and over short time scales to variations in temperature, precipitation and snowcover duration, which impact on land surface stability. In addition mountain glaciers, particularly in mid- and low-latitude areas, often exist near their climatic limits. As such, these mountain environments will be amongst the first to record the geomorphological effects of contemporary climate change. Many mountain glaciers worldwide are presently in retreat, and the dominant geomorphological processes in mountain blocks are in transition from glacial to periglacial/paraglacial in origin. This has major implications for land surface stability in high-relief areas as deglaciated mountain slopes and sediment systems undergo readjustment by paraglacial landsliding and other processes. This readjustment will also be accelerated by warming of alpine permafrost and accompanying changes in mountain ecosystems. Climate forcing of mountain landscape dynamics is highly variable, both spatially and temporally, and climate change is already impacting on mountains in diverse and unpredictable ways. Accelerated retreat of mountain glaciers will lead to a short-term (decadal to century-scale) paraglacial increase in sediment yield to mountain rivers, with increased hazard frequency from avalanches, floods and other phenomena. Instrumented catchments can be used to monitor the response of mountain landscapes to ongoing climate forcing, and will be able to pick up the sediment pulses associated with retreating glaciers. Continued climate warming and glacier retreat, with revegetation of deglaciated landscapes, will cause long term sediment yields to decline. This has major implications for downstream river and coastal sediment dynamics over the next century.