



## Revised interpretation of Mueller Glacier moraines, Southern Alps, New Zealand

Natalya Reznichenko, Tim Davies, and Stefan Winkler

University of Canterbury, Department of Geological Sciences, Christchurch, New Zealand (stefan.winkler@canterbury.ac.nz, +64 (0)3 364 2769)

A sequence of moraine ridges on the Mueller Glacier foreland, Southern Alps, New Zealand has previously formed part of a database used to develop a local/regional palaeoclimate chronology; however, it is possible that factors other than climate may have caused or influenced these moraine formations. Rock avalanches that deposit large volumes of rock debris on glacier ablation zones can affect glacier behaviour and cause moraine formation that does not necessarily reflect a climatically-driven advance (Reznichenko et al., 2011). Therefore, prior to the correlation of dated moraines with regional climate alterations, it is required to determine the genesis of these features. In previous studies the possible formation of some Mueller moraines by large-scale mass movements has been neglected that could have resulted in wrong assumptions of moraine positions having been entirely forced by climate change.

The presence of modern rock avalanche deposits on glaciers in the Aoraki/Mt. Cook area indicates the probable contribution of supraglacial rock avalanches to the formation of these moraines in the past. This argument was recently supported by the presence of rock-avalanche-indicating agglomerates found in the sediment from two Mueller Glacier moraine ridges (Reznichenko et al., 2012). Previous interpretations of these ridges are inconsistent and are usually attributed to reflecting several glacial climatic-driven advances. In current research presented morphological and sedimentological analysis evidence that this feature is a single moraine (the “Mueller Memorial Moraine”) formed following supraglacial transport of a large volume of rock avalanche debris to the glacier snout. Because a moraine formed by this process has no necessary association with a climate event, this finding raises concerns about the palaeoclimatic significance of this moraine; and, by implication, of other moraines in similar situations.

### References

Reznichenko, N.V., Davies, T.R. and Alexander, D.J., 2011. Effects of rock avalanches on glacier behavior and moraine formation. *Geomorphology* 132: 327-338.  
Reznichenko, N.V., Davies, T.R., Shulmeister, J.P. and Larsen, S.H., 2012. A new technique for identifying rock avalanche-sourced sediment in moraines and some palaeoclimatic implications. *Geology* 40: 319-322.