Geophysical Research Abstracts
Vol. 17, EGU2015-2929, 2015
EGU General Assembly 2015

Coming early, staying longer and going further – the structure of glaciation during the LGM in New Zealand

David Fink (1), Henrik Rother (2), and James Shulmeister (3)

(1) ANSTO, Institute for Environmental Research, Sydney, Australia (fink@ansto.gov.au), (2) Institute of Geography and Geology, Ernst-Moritz-Arndt University Greifswald, Germany, (3) School of Geography, Planning and Environmental Management, University of Queensland,Australia

Recent debate on numerically dated records of late Quaternary glaciation in the Southern Alps of New Zealand has focussed on resolving the temporal dynamics of regional glaciation between the local-LGM and the last glacial termination. The results have potentially far reaching implications for determining phase relationships with Northern Hemisphere glacial signals during the late Quaternary and our understanding of the specific drivers of past glaciations in the mid-latitude Southern Hemisphere. Here we present a synthesis based on glacial mapping and a total of 111 CRN surface-exposure-ages (10Be) from moraines in three major valley systems located in the central Southern Alps (Rangitata, Rakaia, Waimakariri Valleys). Based on a revised 10Be-production-rate for New Zealand (Putnam et al. 2010) glaciers in all three valleys reached their local-LGM before 26-28 ka. This implies that the largest LGM advances in this region did not coincide with the coldest phase during the 30-20 ka period. We also find that during their maximum extent, glaciers in all three valleys extended beyond the previously mapped LGM ice limits. In the case of the Waimakariri Valley, LGM glaciers overflowed the Avoca Plateau, so far believed to represent a mid-Pleistocene glacial surface (i.e. MIS 8). The onset of retreat from LGM ice positions occurred well before 21 ka. Further ice recession, evidenced by clustered retreat moraines dating to between 19-16 ka, was very gradual and shows that substantial valley glaciers survived in all three valleys until at least 17-16 ka. Taken together, these records document an early LGM followed by an overall trend of diminishing ice volume in New Zealand between 28-20 ka. Our findings also show that in valleys were ice retreat was not accelerated by glacier calving the regional post-LGM ice retreat was very gradual, contrary to a rapid post-LGM ice collapse widely inferred for the Southern Alps.