RECONSTRUCTING DEBRIS TRANSPORT PATHWAYS ON CONSTRUCTIONAL RIDGES: WAHIANOA GLACIER, MT RUAPEHU

A thesis presented in partial fulfillment of the requirements for the degree of Master of Science in Quaternary Science, at Massey University, Palmerston North, New Zealand.

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April 2007

The Wahianoa Glacier of Mt Ruapehu, New Zealand, looking north-west. The glacier is confined by Girdlestone Peak (left), and Mitre Peak (right).

Abstract

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It is generally accepted that Mt Ruapehu, Tongariro National Park, New Zealand, was heavily glaciated during the Pleistocene. Eight small glaciers can still be found on the summit of this active volcano. However, the glaciers have been retreating at a fast rate during the last few centuries. The scientific community has placed its main focus on the volcanic aspects of the region. Although most authors refer to the landforms that appear to be of glacial origin as 'moraines', no actual glacial studies have been undertaken so far to provide the necessary evidence that is needed to support this hypothesis.

The aim of this study is to use established field techniques in glacial geomorphology to (1) identify the extent of glacial deposits using diagnostic criteria and (2) to reconstruct the transport pathways of the Wahianoa Glacier. Four main diagnostic criteria have been used: clast morphology, macrofabrics, grain size distribution and the surface texture of grains. The Wahianoa valley has a very pronounced U-shape and is likely to be of glacial origin. The valley consists of two elongate debris ridges that are made out of unconsolidated, poorly sorted diamict of varying lithologies.

This study has identified that the activity and the composition of the volcano has lead to complex glacial processes. Glacial ice has advanced over a deformable bed and the glacier itself was probably extensively covered by supraglacial debris. The area has been identified as a pre-historic pathway for lahars and the volcano erupts frequently to produce fresh volcanic deposits. As the active vent has changed its position during the eruptive history of the volcano, the quantity and the location of the source rock that fed the glacier has varied greatly. This study is an initial attempt at unfolding the glacial

history of Mt Ruapehu. This is based on field analysis of glacigenic sediments, rather than topographic and aerial photo analysis. The results show great complexity and the potential for further studies of other moraine systems on Mt Ruapehu.

ACKNOWLEDGEMENTS

I extend my sincere thanks and appreciation to my supervisor, Dr Martin Brook, for the support and feedback given throughout the year.

I wish to thank Dough Hopcroft, for the help with the SEM analysis.

Special thanks to John Procter for giving his permission to reproduce some of his findings.

I also like to thank Dr Bernd Striewski for his help with the sedigraph analysis.

Many thanks to David Feek for the help and organisation of field and laboratory equipment.

I also wish to thank my family for their unfailing support and understanding.

Lastly, I would like to thank Erin Nolan for the many hours we have spent together in the field and for helping to make Ohakune an exciting place during the summer months.

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