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THE LATE QUATERNARY COVER BED  
STRATIGRAPHY AND TEPHROCHRONOLOGY OF  
NORTH-EASTERN AND CENTRAL TARANAKI,  
NEW ZEALAND.

A thesis presented in partial fulfilment  
of the requirements for the degree of  
Doctor of Philosophy in Soil Science at  
Massey University, Palmerston North,  
New Zealand.

by  
BRENT VICTOR ALLOWAY  
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" We shall never achieve harmony with land, any more we shall achieve justice or liberty for people. In these higher aspirations the important thing is not to achieve, but to strive....."

Aldo Leopold

DEDICATION

This thesis is jointly dedicated to:

- |                    |   |
|--------------------|---|
| Ana Pickering,     | who, since the time of our marriage, has<br>been a pillar of support and encouragement.                                   |
| C.G. Vucetich,     | my lecturer at Victoria University and Ph.D<br>supervisor, who made late Quaternary geology<br>so animating and alluring. |
| T.L. Grant-Taylor, | geologist and friend, who kindled my first,<br>very early interest in geology.  |

DECLARATION

Except where otherwise acknowledged in the text, this thesis represents the original research of the author.

B.V. Alloway

### ACKNOWLEDGEMENTS

I am pleased to acknowledge the patient assistance of both my supervisors: Dr V.E. Neall (Massey University) and Mr C.G. Vucetich (retired; formerly of Victoria University), whose willingness to help me over the past five years has been greatly appreciated.

I also thank the Soil Bureau, D.S.I.R., for financial support and the Department of Soil Science for continual support of departmental facilities and attention to administrative details.

The following people have all made invaluable contributions to the making of this thesis:

- Dr. M.S. McGlone, Botany Division, D.S.I.R., Christchurch.  
(Palynological data and discussion)
- Dr. A.S. Palmer, Soil Science Department, Massey University, Palmerston North.  
(Field assistance and discussion)
- Dr. R.B. Stewart, Soil Science Department, Massey University, Palmerston North.  
(Laboratory assistance and discussion)
- Dr. C. Wallace, Soil Science Department, Massey University, Palmerston North.  
(Laboratory assistance and discussion)
- Dr. D. Lowe, Earth Science Department, Waikato University, Hamilton.  
(Radiocarbon dates and discussion)
- Dr. B.J. Pillans, Research School of Earth Sciences, Victoria University, Wellington.  
(Amino acid date and discussion)
- Dr. P.C. Froggatt, Research School of Earth Science, Victoria University, Wellington.  
(Rhyolitic glass chemistry and discussion)

- Dr. P. Blascke, Division of Land and Soil Sciences, Taita.  
(Field assistance and discussion)
- Dr. D. Seward, c/- Institut fur Mineralogie und  
Petrographie, Eidgenossische Technische Hochschule, Zurich.  
(Fission track date)

In addition I greatly benefited from fruitful discussions with Dr. D.J.G. Milne, Dr. J.A. Pollok, Dr. R. Bussell, Mr R.W.P. Palmer and Mr B. Purdie.

I am particularly indebted to Mr and Mrs Bob Duncan of New Plymouth, Mrs Pat Scott of New Plymouth, Matt and Carolyn Cook of Stratford and Department of Conservation Officers in Stratford and New Plymouth, for accommodation while conducting fieldwork. I would also like to thank my flatmate - Andrew Revfiem who helped me make the necessary changes to my thesis that allowed laser printing. I would like to extend a special note of thanks to my good friend - John Doogan who magnificiently reproduced the multitude of photos presented in this thesis.

I also gratefully acknowledge the cooperation of the many landowners in Taranaki, who with tremendous interest, cheerfully allowed access to their properties.



## ABSTRACT

This study involved the recognition and description of tephra, lahar and debris avalanche deposits generated from activity centred at Egmont Volcano over the last c.130kyrs B.P. Stratigraphic relationships between the various cover bed deposits of north-eastern and central Taranaki are discussed and their distributions mapped where possible.

The stratigraphic record indicates that tephra emission and lahar inundation are typical, recurring features of Egmont Volcano. Average periodicity for moderate to major sized eruptions ( $>10^7$  m<sup>3</sup>) may be as frequent as, one every 250 years. Tephras from Egmont Volcano have been correlated to both the adjacent Wanganui and Waikato districts.

Six rhyolitic tephras erupted from the Central North Island have been identified in Taranaki and are especially valuable as widespread time planes within the andesitic cover bed succession.

At least thirteen lahars are shown to have been deposited over extensive areas of the ring plain during the last 22.5kyrs B.P. Many of these lahars became channelised within stream and river catchments to extend to the North Taranaki coastline.

Partial or complete collapse of Egmont Volcano at c.23kyrs and much earlier at c.100kyrs B.P. generated large volumed, debris avalanches that spread principally over a wide north-eastern to south-eastern arc. The resulting deposits are characterised by extensive areas of mounds now deeply buried by a younger late Pleistocene and Holocene tephra mantle.

The stratigraphy of an alternating sequence of reddish (S-units) and yellowish (L-units) medial beds was also investigated. Generally their thinning pattern is similar to that of coarse ash and lapilli suggesting tephric origin. The thinning pattern of L-units however, is occasionally interrupted by localised overthickening and indicates localised aeolian deposition during cool to cold climatic periods. The biostratigraphic record constructed from pollen examinations support the climatic interpretations made from the medial stratigraphy.

The measurement of quartz content in medial units is shown to be a particularly useful parameter for assessing past climatic conditions. Two peaks in quartz influx were recorded and correlated to the full-glacial periods of oxygen isotope stages 2 and 4.

Forming the North Taranaki coastal plain are five uplifted marine terraces, that provide a c.0.45 Ma record of successive sea level oscillations with moderate to low rates of crustal deformation. The present extent of these terraces is related to lahar deposits within their cover beds which have repeatedly advanced the coastline and retarded coastal erosion.

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