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**LATE HOLOCENE ENVIRONMENTAL RECORD
AND GEOLOGICAL HISTORY OF THE
LAKE COLENZO AREA,
NORTH-WESTERN RUAHINE RANGE,
NEW ZEALAND**

A thesis presented in partial fulfilment of the requirements for the degree of

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Abstract

Sediment cores from a landslide-dammed lake, Lake Colenso (North Island, New Zealand), contain a decadal- to centennial-scale record of changing climate spanning the past 1800 years. A multi-proxy approach has been used to obtain a high-resolution record of variability from the Lake Colenso catchment, and tephra horizons combined with radiocarbon ages provide chronological constraints. Since the lake is located within a mountainous forested catchment of the northern Ruahine Range, it has remained pristine and isolated from human disturbance. Additionally, pollen analysis indicates minimal human influence in the lake catchment; hence the site offers a rare opportunity to investigate natural environmental change during a period in which anthropogenic impact has tended to obscure natural variability in many records from elsewhere in New Zealand (Wilmshurst *et al.*, 1997).

Sedimentology and elemental geochemistry reflect periods of rapid sediment influx into the lake, here interpreted as storm events which are preserved at an average of 1 every 150 years. This record, supported by stable isotope records from ostracods, shows distinct periods of increased storminess, and is related to the interaction between regional atmospheric circulation systems, El Niño-Southern Oscillation, Southern Annular Mode and the Pacific Decadal Oscillation. Furthermore, the association with other regional records of climate over the late Holocene highlights the effect of regional climatic forcing. A combination of findings is characterised by broad changes that correlate to the regionally distinctive Medieval Warm Period and Little Ice Age periods, providing further evidence for a climatically variable Holocene (Mayewski *et al.*, 2004). The multi-proxy record presented here is a valuable contribution to existing paleoenvironmental knowledge of the late Holocene in New Zealand.

The geology of the study area is characterised by alternating periods of subsidence and uplift throughout the Plio-Pleistocene which resulted in the deposition of Wanganui Basin sediments in the region. Historic earthquake records from nearby major faults are commensurate with ages obtained for landslides at Lake Colenso, which allow a further understanding into landscape evolution and the development of present-day Lake Colenso.

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Table of contents

Abstract	ii
Acknowledgements	iii
Table of contents	iv
List of figures	viii
List of tables	xiii
Chapter 1: Introduction	1
1.1 Introduction.....	1
1.2 Aims of the study	2
1.3 Rationale	3
1.4 Thesis structure	4
Chapter 2: Literature review	5
2.1 Landslide-dammed lakes and earthquakes	5
2.1.1 <i>Background</i>	5
2.1.2 <i>Past studies in New Zealand</i>	6
2.1.3 <i>Conclusion</i>	8
2.2 The Ruahine Range and wider environmental changes from 2000 years to present..	9
2.2.1 <i>Past vegetation change in the Ruahine Range</i>	9
2.2.2 <i>Vegetation and environmental changes in a regional context</i>	14
2.2.3 <i>Conclusion</i>	15
Chapter 3: Study area	17
3.1 Site location	17
3.2 Vegetation.....	19
3.2.1 <i>Present vegetation</i>	19
3.2.2 <i>Change in the last 150 years</i>	20

3.2.3 <i>History of fire and burning</i>	21
3.3 Climate.....	22
3.4 Geology.....	25
3.4.1 <i>Geological history</i>	25
3.4.2 <i>Fault and tectonic history</i>	27
3.5. Summary	29
Chapter 4: Methods	30
4.1 Geology.....	30
4.1.1 <i>Geological mapping</i>	30
4.2 Geomorphology	30
4.2.1 <i>Determination of ages</i>	30
4.3 Lake Colenso	33
4.3.1 <i>Core extraction, analysis and stratigraphy</i>	33
4.3.2 <i>Sedimentology and dry bulk density</i>	38
4.3.3 <i>Chronology</i>	41
4.3.4 <i>Biogeochemistry</i>	43
4.3.5 <i>Pollen, ostracods and molluscs</i>	45
Chapter 5: Results	48
5.1 Geology.....	48
5.1.1 <i>Background</i>	48
5.1.2 <i>Local geological sequence</i>	50
5.1.3 <i>Geological map</i>	57
5.1.4 <i>Stratigraphic column</i>	58
5.2 Geomorphology	59
5.3 Lake Colenso	63
5.3.1 <i>Chronology</i>	65
5.3.2 <i>Sedimentology and dry bulk density</i>	72

5.3.3 <i>Biogeochemistry</i>	74
5.3.4 <i>Palynology, ostracods and molluscs</i>	76
5.3.5 <i>Summary</i>	84
Chapter 6: Discussion	86
6.1 Landscape evolution	86
6.1.1 <i>Geological history</i>	86
6.1.2 <i>Geomorphology</i>	90
6.2 Lake Colenso	92
6.2.1 <i>Assessment of chronology</i>	92
6.2.2 <i>Sediment analysis and interpretation of silt layers</i>	97
6.2.3 <i>Paleohydrology</i>	107
6.2.4 <i>Vegetation history</i>	111
6.2.5 <i>Lake paleoecology</i>	120
6.3 Synthesis of environmental change in the Lake Colenso area.....	122
Chapter 7: Conclusion	125
7.1 Environmental significance	125
7.2 Future research.....	126
References	128
Appendices	147
Appendix 1 - Core logs	147
<i>Core 1</i>	147
<i>Core 2</i>	148
<i>Core 3</i>	149
<i>Core 4</i>	150
<i>Core 5</i>	151
Appendix 2 - Description and identification of ostracods and molluscs	152
<i>Ostracod classification</i>	152

<i>Mollusc classification</i>	155
Appendix 3 - Major elemental glass chemistry data	157
<i>Tufa Trig Formation member 5</i>	157
<i>Tufa Trig Formation member 1</i>	157
<i>Taupo Pumice</i>	158
Appendix 4 - Stable isotope data	159

List of figures

Figure 2.1. Map showing the palynological study sites mentioned in the text. Three Kings 1 and 2, refer to the separate Three Kings Range study sites (Rogers, 1987).	10
Figure 2.2. Diagram showing period of time represented from each study site. ¹ Lees (1981; 1986), ² Moar (1959; 1961; 1967), ³ Rogers and McGlone (1989) and *ombrogenous peat bogs (Froggatt and Rogers, 1990).	11
Figure 3.1. A. Map showing the Ruahine Range in central-southern North Island. B. Aerial photo showing forested environment of Lake Colenso area, dashed line represents the podocarp-broadleaf forest boundary discussed in section 3.2.1, while the toothed white lines mark the dominant landslide scarps (aerial photo from Land Information New Zealand, 2010). C. Regional map of Ruahine Range (grey line showing the boundary of the Ruahine Forest Park), showing proximity to Tongariro Volcanic Centre, and locations named in-text.....	18
Figure 3.2. Present vegetation distribution in the northern Ruahine Range.	21
Figure 3.3. Selected climate stations marked with squares in the north-western Ruahine Range with respect to Lake Colenso.....	23
Figure 3.4. Annual rainfall from selected locations within the north-western Ruahine Range (National Institute of Water and Atmospheric research, 2011), and SOI (Bureau of Meteorology, 2011).....	24
Figure 3.5. A. Geological map showing of central/southern North Island (adapted from Geological and Nuclear Science, 2010). Letters represent trench locations mentioned in Table 3.2 (Hanson, 1998; Langridge <i>et al.</i> , 2007), A. Wedd; B. Davis; C. Syme; D. McCool; E. Trotter; F. Paper Road; G. Beagley; H. Inglis; I. Army Depot; J. Ebbett; K. Hughes; and L. Death. B. Local geology of the immediate Lake Colenso area by Kingma (1962).	26
Figure 4.1. Location of Colenso Hut section relative to Lake Colenso and Colenso hut. The dashed line represents the outer limit of landslide material mapped from field mapping and aerial photography.....	31
Figure 4.2. Top. Colenso Hut section. Lines are drawn to distinguish the main lithostratigraphic changes. ‘X’ shows the positioning of the wood sampled for radiocarbon dating (person for scale). Bottom. Diagram showing different lithological units.....	32
Figure 4.3. Specialized platform used for coring.....	34

Figure 4.4. Topographic map of Lake Colenso area, showing transects where depth was measured using a depth sounder, interpolated isobaths and locations where sediment cores were extracted (numbers represent the different locations).	34
Figure 4.5. Correlation columns showing the relationship of strata between extracted sediment cores.	36
Figure 4.6. Stratigraphic column showing a photo and lithotypes of the composite core (cores 3 and 4). Key same as Fig. 4.5.	37
Figure 5.1. Rose diagrams showing the dip angle and dip direction of different lithological units. Left. Mesozoic basement rock. Right. Cenozoic marine sedimentary rock. Data presented is from Browne (1978), Smale <i>et al.</i> (1978) and from field mapping in this study (Fig. 5.10).	49
Figure 5.2. Folded greywacke of the Mesozoic basement rock, Maropea Stream.	50
Figure 5.3. A, B. Float of the Basal conglomerate, Mangatera River (Photos: Vince Neall). C. Basal conglomerate, Unknown Stream (Photo: Stephen Carey).	51
Figure 5.4. A. Broken <i>Purpurocardia purpurata</i> , Mangatoro Formation, Unknown Stream. B. Mangatoro Formation, Unknown Stream.	52
Figure 5.5. A, B. Float material showing concentration of fossils beds, sandstone unit of the Kaumatua Formation, Potae stream (This is not an approved New Zealand Geographic name; it has been introduced here to avoid ambiguity). C. Siltstone bands and ichnofossil layer, Potae stream.	53
Figure 5.6. A. Freshly exposed surface showing crystalline structure of unit. B. Northern scarp, Lake Colenso, line showing sharp contact between sandstone and limestone. C. Limestone flags (weathered) (Photo: Andrew Mercer). D. Shell-hash limestone, Unknown Stream-Colenso saddle.	54
Figure 5.7. A. Te Rakaunuiakura from Makirikiri Tarns (Photo: Tony Gates). B. Makirikiri Tarns from Te Rakaunuiakura looking north-east (Photo: Tony Gates). C. Te Rakaunuiakura. D. Aorangi from an oblique aerial view (Photo: Tony Gates).	55
Figure 5.8. Oblique view of Ohutu fault showing vertical displacement, Mt Ruapehu is visible in the background. Taken from Te Rakaunuiakura looking towards Ohutu Ridge, note the relatively flat surface of the limestone on the downthrown side (Photo: Tony Gates).	56
Figure 5.9. Oblique view of Potae fault showing vertical displacement. Taken from Potae looking north-east. Note the relatively flat surface of the limestone on the downthrown side that has since been tilted to form cuesta landforms along the fault (arrows).	56

Figure 5.10. Geological map of the Lake Colenso region.	57
Figure 5.11. Stratigraphic column for Lake Colenso region.....	58
Figure 5.12. Oblique view of landslide and locations discussed in text	59
Figure 5.13. Landslide-D extent (dashed line) with Mangatera River in the foreground (photo: Vince Neall).....	61
Figure 5.14. Aerial photograph of landslides in the Lake Colenso basin.	62
Figure 5.15. Composite core constructed from cores 3 and 4, as well as photos and x-ray images from the main stratigraphic boundaries and layers of interest (n.b. Tephra-2 is not shown here as it is difficult to identify in photos and x-ray images). Key same as in Fig. 4.5.....	63
Figure 5.16. Grain size distribution for tephra-1, -2 and -3.	65
Figure 5.17. Compositional scheme adapted from Le Maitre (1984) showing composition of tephtras from Lake Colenso. It should be noted that some values were excluded in this diagram, because they are thought to represent feldspar (andesine) based on the high aluminium, sodium and calcium values. Andesine is a common feldspar in rhyolitic tephtras, and is commonly present as microlite inclusions in andesitic glass. Data recalculated to 100% on a volatile-free basis.....	66
Figure 5.18. Bi-plot of K ₂ O and SiO ₂ following the andesitic compositional scheme of Shane (2005). Data recalculated to 100% on a volatile-free basis. Tf refers to the Tufa Trig Formation (Donoghue <i>et al.</i> , 1995).....	67
Figure 5.19. Total clastic percentage, total percentage silt and dry bulk density of the composite core, Lake Colenso.	73
Figure 5.20. Bulk organic geochemistry measurements from the composite core showing the organic matter content and C:N ratio.	74
Figure 5.21. Stable isotope values of $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ extracted from ostracods (<i>Gomphocythere duffi</i>) from Lake Colenso. Raw stable isotope values are presented in Appendix 4.	75
Figure 5.22. A. Relative pollen diagram from core 2 showing tall trees and small trees and shrubs. Dates are from radiocarbon and tephra samples and are presented in cal yr BP; * indicates it is a tephra-derived date and, ** indicate a radiocarbon date that has been affected by the hard-water effect, discussed in section 6.2.1.....	77
Figure 5.22. B. Relative pollen diagram from core 2 showing herbs and ferns. Dates are from radiocarbon and tephra samples and are presented in cal yr BP; * indicates it is a	

tephra-derived date and, ** indicate a radiocarbon date that has been affected by the hard-water effect, discussed in section 6.2.1.....	77
Figure 5.22. C. Relative pollen diagram from core 2 showing wetland and aquatics and exotic. Dates are from radiocarbon and tephra samples and are presented in cal yr BP; * indicates it is a tephra-derived date and, ** indicate a radiocarbon date that has been affected by the hard-water effect, discussed in section 6.2.1.....	77
Figure 5.23. Ostracod species abundance represented as valves per gram of sediment. Variation in <i>G. duffi</i> gender also shown (male represented with blue, and female represented with pink).....	81
Figure 5.24. Mollusc abundance, represented as valves per gram of sediment.	83
Figure 6.1. Paleoseismic records (Hanson, 1998; Langridge <i>et al.</i> , 2007) for Kaweka, Ruahine, Mohaka and Wellington Faults plotted against latitude. Dashed line highlights the latitude of Lake Colenso. Arrows present minimum and maximum ages for seismic events (Hanson, 1998), i.e. an event on the Ruahine Fault that occurred >1717 cal yr BP is shown by a purple point at 1717 and arrow pointing downward. Shaded areas represent periods of increased seismic activity on the Pahiatua section of the Wellington Fault as put forward by Langridge <i>et al.</i> (2007).....	90
Figure 6.2. Age model for composite sediment core, based on tephra and radiocarbon dates. All ages are in cal yr BP, and have been calibrated using OxCal4.1 (Bronk Ramsey, 2001) and SHCAL04 dataset (McCormac <i>et al.</i> , 2004). Storm ID numbers (e.g., St-A) and hashed lines shown here correspond to those in Table 6.2.	95
Figure 6.3. Summary diagram of results used to assess the environmental history of the Lake Colenso area.	96
Figure 6.4. Summary graph showing $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ records from Lake Colenso and storm events (represented as grey lines) against periods of climatic change from a variety of proxies and environments discussed in text. (1) Hubbard and Neall (1980); (2) Grant (1985); (3) Lorrey <i>et al.</i> (2008); (4) Page <i>et al.</i> (2010); (5) Wilmshurst (1997); (6) Chester and Prior (2004); (7) McFadgen (1989); (8) Horrocks and Ogden (1988); (9) Lusk and Ogden (1992); (10) Elder (1963); (11) Schaefer <i>et al.</i> (2009); (12) Cook <i>et al.</i> (2002); (13) Palmer and Xiong, (2004); (14) Williams <i>et al.</i> (2004); (15) Jouzel <i>et al.</i> (2006); (16) Petit <i>et al.</i> (2001); (17) Stahle <i>et al.</i> (1998); (18) Macdonald and Case (2005); and (19) Moy <i>et al.</i> (2002).....	103

Figure 6.5. Comparison of the paleoenvironmental record at Lake Colenso against regional proxies showing change in the late Holocene. Red indicates a warm period while blue indicates cool periods, where applicable.....124

List of tables

Table 3.1. Summary of data from climate stations closest to Lake Colenso, north-western Ruahine Range (National Institute of Water and Atmospheric research, 2011).....	23
Table 3.2. Table showing reconstructed earthquake events from the Wellington, Ruahine, Mohaka and Kaweka faults over the late Holocene (n.b. only sites from the northern section of the Wellington Fault are included here and those studies concerning the late Holocene).....	28
Table 5.1. Radiocarbon age data from geomorphological investigation, Lake Colenso.....	60
Table 5.2. Summary of the characteristics of the landslides in Lake Colenso catchment shown in Fig. 5.14.....	62
Table 5.3. Major glass elemental composition of tephras from Lake Colenso core (bold) and other studies.....	69
Table 5.4. Summary table showing distinguishable characteristics of tephras in the Lake Colenso core.....	70
Table 5.5. Radiocarbon age data from composite core, Lake Colenso	71
Table 5.6. Each lithotype can be distinguished by its separate properties and is summarised the accompanying table.....	85
Table 6.1. Summary of main events as interpreted from the units found in the Lake Colenso study area (*discussed in the following sections).....	89
Table 6.2. Original and corrected depths, thicknesses and ages for storms layers.....	99