

Unravelling possible climatic and/or seismic signals preserved in coastal sand dunes and around modern Lake Wairarapa, North Island, New Zealand

Veitch, J.C., Clement, A.J.H., Fuller, I.C., Holt, K.A., McColl, S.T.

Physical Geography Group, Massey University, Palmerston North, New Zealand

Coastal sand dunes evolve in response to environmental changes such as fluctuations in sea (or lake) level, sediment availability, climate, and human disturbances of the environment. Sand dunes in New Zealand have previously been found to record large-magnitude earthquakes producing pulses of sediment delivered to the coast, and changes in sea-level and climatic conditions (Goff and McFadgen, 2002). This ongoing research project is the first to investigate and unlock the archive of palaeo-environmental changes preserved in a sequence of dune ridges located along the south-eastern shore of Lake Wairarapa. We explore the formation and timing of these dunes and test two alternative hypotheses. The first hypothesis is that the dunes record earthquake-triggered sediment pulses delivered to Lake Wairarapa ('Wairarapa Bay' during higher sea-levels) by rivers draining the surrounding ranges. Lake Wairarapa lies immediately adjacent to the Wairarapa Fault that is capable of producing earthquakes of considerable magnitude approximately every 2,200 years. The second hypothesis is that the dunes record climatic signals expressed through changes in the level of Lake Wairarapa, or changes in the wind regime of the area, that result in periodic phases of dune-building activity. Sedimentological and XRF analysis of alluvial and dune deposits collected in cores will be used to explore the wind regime and climate responsible for the formation and evolution of dune ridges. A chronology of dune development will be established using a combination of luminescence and radiocarbon dating. Synthesis from these lines of inquiry will be compared with existing records of seismic activity and past climate to elucidate the environmental drivers responsible for the formation of the dunes and the geomorphic evolution of the lower Wairarapa Valley.