

Dust down under II: provenance and pedogenesis for selected loess soils in New Zealand.

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Soils developed in aeolian derived sediments are prevalent in a range of landscapes and climatic zones in Australia and New Zealand. Aeolian sediments encompass a wide range of particle size and mineralogy (loess, parna, lunettes and sand dunes) with a concomitant range of physical and chemical properties.

In New Zealand, the transport pathway for the loess mantled landscape in the Manawatu district in the North Island of New Zealand is generally accepted, but the morphological and chemical difference between the soils developed on the drier terraces (Tokomaru) compared to those on the moister terraces (Dannevirke) is still not fully understood.

We compared the different provenance and formation pathways for these sediments using a range of techniques including optical micromorphology and granulometric analysis. We also utilised QEMSCAN analysis (Quantitative Evaluation of Minerals by SCANNing electron microscopy). Automated mineralogy analysis integrates scanning electron microscopy and energy dispersive x ray spectroscopy (SEM EDS) hardware with expert software to generate micron scale compositional maps of sediments, and quantitative granulometric information.

We discuss the results in terms of the conceptual differences in the transport pathways and pedogenesis of loess. In the Manawatu, the grain size distribution of the two soils are very similar. However, the Dannevirke soil mineralogy is dominated by kaolinite and chlorite while the Tokomaru soils have a greater proportion of weatherable mineral grains.