The Geology of the Lower Pohangina Valley, Manawatu, New Zealand

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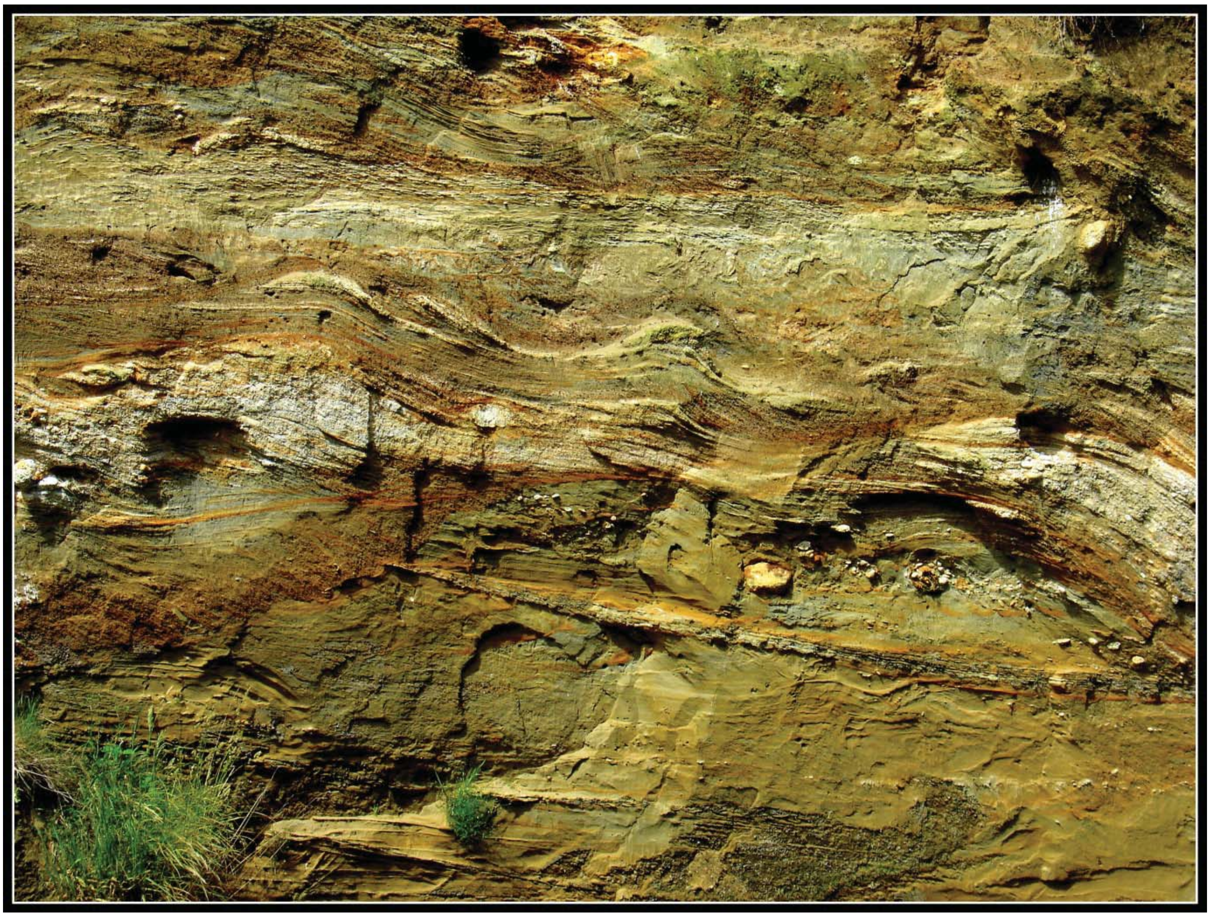

Cross bedded tuff unit within the Css Member, Takapari Formation, Antler Stream, Broadlands Station, Pohangina Valley.

Acknowledgments

Firstly, I wish to thank Dr Alan Palmer for always having his door open, and teaching me how to read and understand the landscape. I think your past students would understand when I say that since keeping up with you in the field, I have become incredibly fit and will now endeavour to join the Olympic speed walking team.

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Craig Deadman

I hope you all find your copies of the geological map interesting and informative. Sincere apologies for running large fault lines through your properties, there was no way round it.

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Abstract

The geology of the lower Pohangina Valley has been mapped at a scale of 1:30,000. This has involved the reclassification of formations described by Carter (1972) in northern Pohangina and correlation of stratigraphy and stratigraphic nomeclamenture to both the Whanganui and Dannevirke subdivisions (Fleming, 1953; Lillie, 1953).

Pohangina geology has been linked to the cyclostratigraphy preserved within the Whanganui Basin (Naish, *et al*, 1998; e.t.c.) via tephrochronology and biostratigraphy, allowing basin wide correlation. The Kaimatira Pumice Sand Formation (Fleming, 1953) is recognised within the study area by the identification of the Potaka Tephra, allowing an upper boundary to be placed upon the Takapari Formation of Carter (1972). Kai Iwi Group sediments are mapped near the axis of the Pohangina Fauted Monocline allowing correlation to the Beehive Creek, Cullings Gully and Finnis Road sections to the west of the study area (Brackley,1999; Townsend, 1993; Seward, 1976; Manning, 1988; and MacPherson, 1985).

Balanced geological cross sections have been constructed and used as aids in structural interpretation. The Pohangina Faulted Monocline (Marden, 1984), a major regional structure, is controlled at depth by a shallow reverse fault. This underlying reverse fault is correlated to the Raukawa Fault of Rich (1959), which outcrops at the western end of the Manawatu Gorge. The Pohangina Faulted Monocline is tentatively correlated with another monoclinal flexure to the south of the Manawatu Gorge, also interpreted to be related to and controlled by the Ruakawa Fault (Rich, 1959). When the eastward dipping Ruakawa Fault is at greater depth, westward dipping normal faults are found and are interpreted as antithetic faults splaying off from the underlying thrust fault.

The Pohangina Fault is mapped as an active normal fault, displacing an Ohakean terrace on the western side of the Pohangina River. The potentially active Whareroa Fault (Ower, 1943) is inferred to cross the Manawatu Saddle area trending SE – NW as a contact fault between Torlesse greywacke and Plio-Pleistocene sediments.

The thrust faulting in the area has resulted in the intense deformation and uplift of Torlesse bedrock contemporaneous with drag-tilting and folding of the Plio-Pleistocene sediments. Erosion within the study area has exposed Takapari Formation beds dipping at up to 70° to the west. Steep dips are traced SW-NE across the landscape, interpreted as representing the axis of the Pohangina Faulted Monocline and also allowing links to be made between areas of exposed faulting mapped by Rich (1959), Ower (1943) and in this study.

Lignite and tephra beds within the Takapari Formation are associated with deposition in an estuarine environment on a coastal plain bordering the Whanganui Basin, during Early Castlecliffian time. Geochemical analyses are used to identify eight tephras, which are used for both stratigraphic control and paleogeographic interpretation.

During Early Nukumaruan time an influx of gravel within the south eastern Whanganui Basin is associated with the formation of a prograding Gilbert-type fan delta within the Cg Member of the Konewa Formation. The gravels are interpreted as being derived from exposed greywacke in the vicinity of the present day northern Ruahine Ranges, 40 to 70 km north of Pohangina. Distance from source is calculated from clast size within the conglomerate and together with mineralogy provide evidence of provenance. Biostratigraphic and lithostratigraphic changes are used as evidence to support wider interpretations involving paleogeography and the geological history of the lower North Island.

Depositional environments are interpreted using facies analysis, tephrochronology, grain size analysis, and biostratigraphy. Detailed stratigraphic logs are compiled and interpreted in terms of depositional history and sequence stratigraphy. Marker horizons and bio-events allow correlation of stratigraphy to the Whanganui Basin cyclostratigraphy and marine oxygen isotope record. This information is then used to build an overall regional geological history of the area, including understanding basin development, paleogeography, provenance and depositional history.

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