

## **SIRG (NZ) - 2009 MEETING, Albert Town, Wanaka New Zealand**

David Barrell presents a photo-review of Field Trip 2 - 'Glacial History of the Upper Clutha', 18 February, 2008, led by Royden Thomson and Trevor Chinn.



After a 'wake-up' climb to the summit of Mt Iron, Royden (black cap) and Trevor (light brown cap) describe features of interest. Looking west across part of Lake Wanaka, a small glacier on Fog Peak is prominent near the skyline, while to its right, a glimpse is caught of parts of the Rob Roy Glacier and Avalanche Glacier.



The panorama east from Mt Iron includes views of moraines and outwash terraces formed during the 'Albert Town' advance of the Last (Otira) Glaciation.



From the highway between Tarras and Luggate, the view up-valley includes the 'Hawea' (lower) and 'Albert Town' (higher) glacial outwash terraces of the Clutha. The ice-scoured schist knob of Mt Iron, one of several roches moutonnées in the basin, stands a little above the Albert Town (Wanaka airport) surface in centre. Fog Peak glacier is near the centre-right skyline.



Northeast of Tarras, large accumulations of morainic gravel were deposited during the 'Lindis' advance of ice from the Clutha catchment. Elements of moraine loop landforms survive, despite the great age of these deposits (a calcite concretion in post-'Lindis' glacial lake silt indicates a minimum age of around 400 ka for Lindis deposits).



The youngest member of the party is more interested in the geology of road aggregate at Bendigo mining historic reserve than in the glacial geology of the upper Clutha which forms the spectacular backdrop to the northwest.



Royden Thomson (front right) provides a practical demonstration of 'drop stone' processes using the No\_2 shaft of Bendigo mine area. The extensive 'Lindis' moraine and outwash terraces dominate the mid-ground centre of this view looking northwest.



Lodgement till deposited during the 'Lowburn' ice advance (predating, and slightly more extensive than, the 'Lindis' advance) exposed in the road cutting just downhill from the Bendigo mine area. Post-depositional soil carbonate accumulations (caliche) permeate the matrix of the deposit and contribute to the light colour apparent in this view. The formerly overlying oxidised part of the soil profile has been eroded away here, though a remnant is visible at the top. Greywacke clasts within the carbonate zone are extremely hard, and appear essentially unweathered, despite having lain in this near-surface position for more than 400,000 years.



The 'Lindis' outwash terrace northwest of Lowburn near Cromwell is backed at its upstream end by a moraine ridge (right of trees). Photo below is taken from that ridge.



This 'Lindis' moraine ridge, at about the 'Lindis' ice terminus, is about 45 km down-valley of the late Last Glaciation ('Hawea') terminal moraines of the Clutha catchment. This illustrates the truly remarkable extent that ice achieved in northwestern Otago during mid-Pleistocene glaciations. Royden (right) suggests that something of the nature of ice caps formed over the upper catchment in these early glaciations, in contrast to a more valley-style glacierization during more recent, much smaller, ice advances.

Many thanks to the trip leaders for a great day out. For those interested, more information on, and syntheses of, Royden's glacial geology work can be found in

McSaveney, M.J., Thomson, R., Turnbull, I.M., 1992. Timing of relief and landslides in Central Otago, New Zealand. In Bell, D.H. (Ed.): Landslides/Glissements de terrain: Proceedings of the 6th International Symposium, February 1992, Christchurch, New Zealand. Balkema, Rotterdam. Vol 2: p. 1451-1456.

Turnbull, I.M., (compiler) 2000. Geology of the Wakatipu area. Institute of Geological & Nuclear Sciences 1:250 000 geological map 18. 1 sheet + 72 p. Lower Hutt, New Zealand. Institute of Geological & Nuclear Sciences Limited.