New Zealand acquisition, spring 2011

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ABSTRACT

The magnitude 7.1 Darfield earthquake occurred September 4, 2010, west of Christchurch New Zealand on the Greendale fault, which was not previously known to exist. Structural damage was sustained in Christchurch, but no loss of life. Don Lawton suggested it might be an idea to ship the University of Calgary's seismic equipment to New Zealand to try and delineate the fault, but at the time the cost was deemed prohibitive. Then, after many smaller aftershocks, a magnitude 6.3 earthquake centered near downtown Christchurch caused major structural damage (50-60% of downtown buildings need to be demolished) and loss of 182 lives. Shortly afterwards we were contacted and requested to undertake seismic surveys in and around the city.

The University of Calgary's INOVA (ARAM) Aries recording system with 600 channels of 1C marsh phones, boxes, batteries, cables and our IVI EnviroVibe were trucked to Chicago, air-lifted to Auckland, and completed the journey to Christchurch via transport truck. Four CREWES personnel flew to New Zealand to conduct the seismic surveys in conjunction with the University of Canterbury and Southern Geophysical. Six 1C-2D seismic lines with a total line length of 41 km were successfully acquired in the Christchurch area April 5-May 30, 2011, including two within the Christchurch metropolitan area, and one across the surface expression of the Greendale Fault.

1. New Brighton Beach

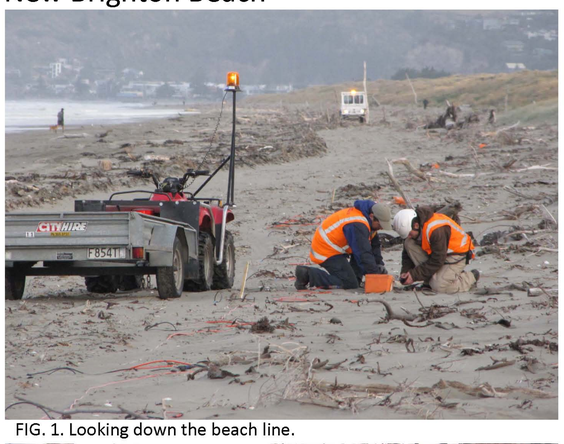

FIG. 1. Looking down the beach line.

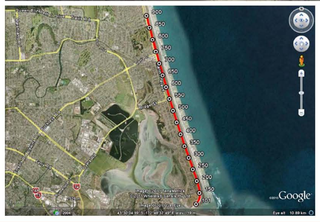

FIG. 2. (Above) Beach sand liquefied if vibe was too close to the water.

FIG. 3. (Left) Beach line aerial view.

2. Barbadoes Street

FIG. 4. One of the historic buildings damaged by the earthquake.

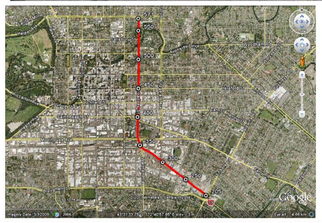

FIG. 5. (Above) A well protected geophone.

FIG. 6. (Left) Railway line (lower portion) and Barbadoes Street line (North/South portion) aerial view.

3. Highfield Road

FIG. 7. Fault as it appears on the surface.

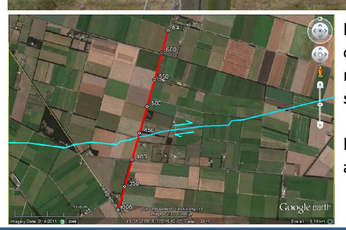

FIG. 8. (Above) A good visual of how much the ground moved, the fence used to be straight.

FIG. 9. (Left) Highfield Road aerial view with fault line.

4. Robinsons Road and Newtons Road

FIG. 10. Recorder and vibe.

FIG. 11. University of Canterbury student changing a battery at the intersection of Robinsons Road and Newtons Road.

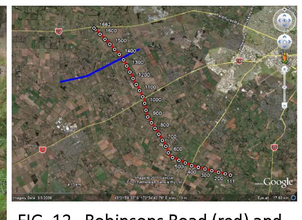

FIG. 12. Robinsons Road (red) and Newtons Road (blue) aerial view.

5.Weedons Road

FIG. 13. Station 101 (first flag number) of our final seismic line in New Zealand.

FIG. 14. Malcolm Bertram, Kevin Bertram, Dr. Don Lawton and Kevin W. Hall with the vibe on Weedons Road.

FIG. 15. Weedons Road aerial view.

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