A magnitude 7.1 earthquake occurred at 4:35am on September 4, 2010. With an epicenter just 40km west of Christchurch city (43.55°S, 172.18°E) and a focal depth of only 10km. This produced observed peak ground acceleration (PGA) values exceeding 29%g, with a maximum shaking intensity 9 on the New Zealand Modified Mercalli Intensity Scale.

This earthquake was the most damaging earthquake in New Zealand since the 1931 Hawke’s Bay earthquake, but there was fortunately no loss of life. While much of the urban areas in Canterbury suffered damage to buildings and infrastructure, it is the impact on the alpine areas and the snowpack in particular that this paper will consider.

It has long been known that avalanches can be induced by seismic triggers with the May 1970 M7.8 in Peru and the March 1964 M9.2 in Alaska just a couple of the more notable events. With Canterbury in the middle of a winter it was therefore not surprising to discover that this M7.1 had caused substantial and widespread avalanche activity in the region. The avalanches were predominantly on south and southeastern aspects, but did occur elsewhere. This shaking was enough to cause substantial avalanche activity on aspects where the right mix of layers and loading was present. This may be one of the first documented events where we can identify the role of grain type on earthquake-induced avalanche activity. We will present the evidence collated on both snow and avalanches from this event and explore their relationship to the observed ground shaking.