

Tourism and Seismic Risk: Perceptions, preparedness and resilience in the zone of the Alpine Fault, Southern Alps, New Zealand

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Abstract

The islands of New Zealand lie astride two actively deforming tectonic plates, creating a diverse physical landscape with high scenic value, but one which is prone to a range of natural hazards. The Alpine Fault is a 450 km-long fault which defines the position of the plate boundary as it runs the length of the Southern Alps in the South Island. Paleoseismic evidence suggests it is overdue for a significant earthquake of magnitude $\sim 7.8 - 8$. Coincident with this area of high seismic potential is a burgeoning tourism industry, which, over the past two decades has shown remarkable growth, capitalising on the region's international reputation for unique nature-based tourism experiences. Visitor activities occur, at times, in relatively remote and hazardous settings, such as National Parks, alpine or coastal areas. Many tourism destinations in the Southern Alps can only be accessed via alpine passes or road ends.

This research project adopted three methodological approaches to satisfy two objectives. The first objective of the study investigated the physical outcomes of a large Alpine Fault earthquake on the tourism industry. Modelled isoseismal data for a number of earthquake magnitude scenarios were combined with map overlays illustrating tourist destinations, transport infrastructure, activity settings and travel flows, using ArcView GIS software. The second objective used a quantitative methodology involving a postal survey to gain insights into the total population of tourism operators around the Southern Alps, which generated a 51% response rate. It investigated operator perceptions of regional seismic risk, their perceived level of preparedness, and the factors that influence the resilience of tourism businesses. A third methodological tool involved semi-structured interviews with key tourism stakeholders and tourism business operators to add greater depth and support to the interpretation of the quantitative results.

Results from objective one showed that a magnitude 8 earthquake is likely to produce severe damage to infrastructure, buildings and roads, and cause lengthy interruption to human activities throughout the Southern Alps. Widespread landsliding will cause an immediate drop in visitation due to road closures, with long-term repair work (> 6 months) required to restore access. Visitors in many small, remote, tourism-based communities will be left stranded for a period of days until emergency authorities begin evacuating those most in need, adding to the immediate burden on

communities. Medium to long-term recovery outcomes may be hampered by on-going aggradation of sediment in fluvial systems, particularly on the western side of the Alps. Post-disaster recovery in terms of visitation is predicted to take approximately 12-18 months, depending on the timing of the earthquake.

Objective 2 results suggested tourism operators understand the likelihood of an earthquake on the Alpine Fault, but lack awareness of the potential consequences for their business. Business owners consider themselves to be poorly prepared for a large earthquake, although they see the benefit in taking steps to become more prepared. Emergency managers should make efforts to convert tourism operator motivations into improved business preparedness, primarily by making business preparedness information more readily available to the tourism sector. Demographic variables were found to have only weak correlation with business preparedness. Business characteristics, such as business longevity, size and turnover, had varying degrees of influence on the uptake of key resilience 'tools', including continuity insurance, induction, staff training and disaster planning. Levels of continuity insurance and disaster planning were found to be inadequate and in need of significant improvement in light of the expected outcomes of a future Alpine Fault earthquake on business function.

To date, there has been a significant gap in our understanding about earthquakes and their potential effects on the tourism industry in New Zealand. This doctoral research project built upon the crisis management and risk perception literature by providing critical insights into the seismic risk perceptions and preparedness of business managers in a sector of the New Zealand economy growing in prominence. In addition, it brought together the study of tourism with the science of earthquakes to develop a clear illustration of the physical outcomes of a future Alpine Fault earthquake around the Southern Alps. A magnitude 8 event will cause considerable disruption to tourism activities for a prolonged period. Improvements in business preparedness and resilience are urgently needed, which could be achieved using innovative business and community-driven initiatives, with improved communication and support from government agencies.