

MARSDEN FUND TE PŪTEA RANGAHAU A MARSDEN

Learning about Lahar

What do the 1953 Tangiwai rail disaster and the 2005 devastation at Matata have in common? Both were caused by a fast-moving type of landslide known as a debris flow. The behaviour of debris flows is poorly understood by scientists, but they are a significant hazard to New Zealanders - either directly, through the impact of the flows; or indirectly, by the generation of tsunamis that can strike when debris flows occur under water.

Debris flows from the slopes of volcanoes are also known as lahars. Due to the blockage of the outflow from the crater lake on Mt Ruapehu by eruptions in the 1990s, a lahar is expected to occur in the Whangaehu River at any time, from late 2005 onward.

A research team, led by Dr Shane Cronin from the Institute of Natural Sciences at Massey University and Dr Vernon Manville from the Institute of Geological and Nuclear Sciences, has been awarded a Marsden grant, to collect as much information about the behaviour of the impending Ruapehu lahar as possible. The researchers will use a combination of low-tech methods and innovative high-tech instrumentation to undertake their research.

Dr Cronin and Dr Manville will work with local residents to encourage them to record observations of the behaviour of the lahar as it passes by, and will mark some boulders in the river to measure how far they are moved by the lahar.

More sophisticated techniques include the use of 'LIDAR', an airborne laser scanning system, to map the shape of the Whangaehu River before and after the lahar. LIDAR is a quick method of providing very detailed measurements of the landscape. New systems will also be developed to measure the amount of sediment transported by the lahar. Some of these will make use of the vibrations produced by boulders hitting the riverbed, and also the noise made by debris colliding within the lahar or hitting sensors in the riverbed. The pressure produced by the lahar as it travels over sensors in the river, and fluctuations in magnetic fields caused by magnetic minerals being transported in the flow will also provide useful data.

The information that the team collects will be used to develop numerical models to simulate debris flows. This could help to avoid a repeat of the Tangiwai Disaster or the loss of property at locations such as Matata. Now that they have funding, all that the research team requires is that the lahar occurs to schedule and that their instruments survive the event.

Total Funding: \$720,000 over 3 years

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