

## The geology of Mount Taranaki/Egmont



### Introduction:

In Māori *tara* means mountain peak and *naki* is thought to come from *ngaki* meaning shining - referring to the mountain's winter snow cover.

This volcanic peak stands in isolation to the west of the Central North Island volcanoes. At 2,518 metres high, it is the second highest peak in the North Island after Mount Ruapehu, and is New Zealand's largest mainland volcanic cone by volume.

It is a stratovolcano (also called a composite cone volcano) made of layers of mostly andesite lava flows and pyroclastic (ash) deposits. The summit crater is filled with ice and snow and has a lava dome in the centre. There is a secondary cone called Fantham's Peak on the south side. Volcanic debris from lahars and landslides covers the plains around the volcano. Past huge landslides have reached as far as 40km from the cone, with lava reaching 7 km and pyroclastic flows 15 km from the vent.

Taranaki began erupting about 130,000 years ago, with large eruptions occurring on average every 500 years and smaller eruptions about 90 years apart. An explosive medium-sized ash eruption occurred around 1755 AD and minor volcanic events (creation of a lava dome in the crater and its collapse) occurred in the 1800's. The last major eruption was around 1655 AD. (1)

At present the mountain is considered to be a "sleeping" active volcano that is likely to erupt again. There are significant potential hazards from lahars, debris avalanches, and floods.

## **The igneous rocks of Mount Taranaki and their origin.**

Mount Taranaki is made up of an igneous rock called andesite. Andesite is a fine-grained volcanic rock that is found in stratovolcanic form volcanoes. These volcanoes have steep sides and look like how volcanoes are drawn.

Andesite is a mixture rock made where a subducting plate dips under a continental plate. For Mount Taranaki the subducting plate is the Pacific oceanic plate moving in a westerly direction and it dips under the Australian continental plate. As the Pacific plate moves westward it sinks under the Australian plate and as it sinks the rock melts as the temperature rises. The rock type on the subducting plate is basalt. As the basalt melts it rises as the density is reduced. As it rises to the surface it meets the solid continental rock and is trapped there. The heat from the molten basalt is transferred to the continental rock and helps to melt it. Molten continental rock melts to rhyolite. The molten rocks of basalt and rhyolite mix together and end up making andesite. This andesite migrates along the Egmont Fault and erupts to the surface at Mount Taranaki. (1)

Andesitic volcanoes produce lava that is fairly viscous and does not travel far. The maximum lava flow on Mount Taranaki is about 15 km long. Andesitic volcanoes are quite high and have steep sides because of the thick lava. When the volcano is not erupting lava it erupts ash deposits so the mountain is layered with ash layers and lava flows. The ash deposits are very weak. So the key shape of Mount Taranaki is a step sided volcano.

## **Lahars as an erosional force that helps shape Mount Taranaki.**

Mount Taranaki is famous for its lahars. Much of the landscape around the volcano is the result of lahars. Lahars are where ice and snow are melted during an eruption and lubricate the unstable rocks which slip down the steep sided volcano and rush out over the landscape.

Lahars move at fast speeds due to the water content and because they carry lots of rocks and boulders they are strong erosive agents. On Mount Taranaki they have over-steepened the upper slopes of the volcano making them unstable for when the next eruption occurs.

Lahars are a real concern for future eruptions and since Mount Taranaki could erupt at any time in the future damage from lahars is a major concern. Lahars are extremely dangerous in New Zealand. They can travel up to 40km from the vent area. (2)