

CITY OF VOLCANOES

THE AUCKLAND VOLCANIC FIELD NGĀ TAPUWAE Ō MATAAHO



FACT SHEET 01

Fun volcanic facts from the Determining Volcanic Risk in Auckland (DEVORA) Project

An Introduction to Auckland's volcanoes

The **Auckland Volcanic Field (AVF)**, or **Ngā Tapuwae Ō Mataaho**, is the name given to the volcanic area located in Auckland / Tāmaki Makaurau, New Zealand. The AVF is different to the volcanic systems that construct big volcanic cones in the central North Island of New Zealand, such as Mt Ruapehu or Taranaki. The AVF tends to erupt in a new location each time, instead of experiencing repeated eruptions in one location. The AVF eruptions also tend to be much smaller in scale. This type of activity has resulted in many small hills and pits across the Auckland landscape, rather than one big cone. This fact sheet shares some interesting facts about Auckland's many volcanoes.

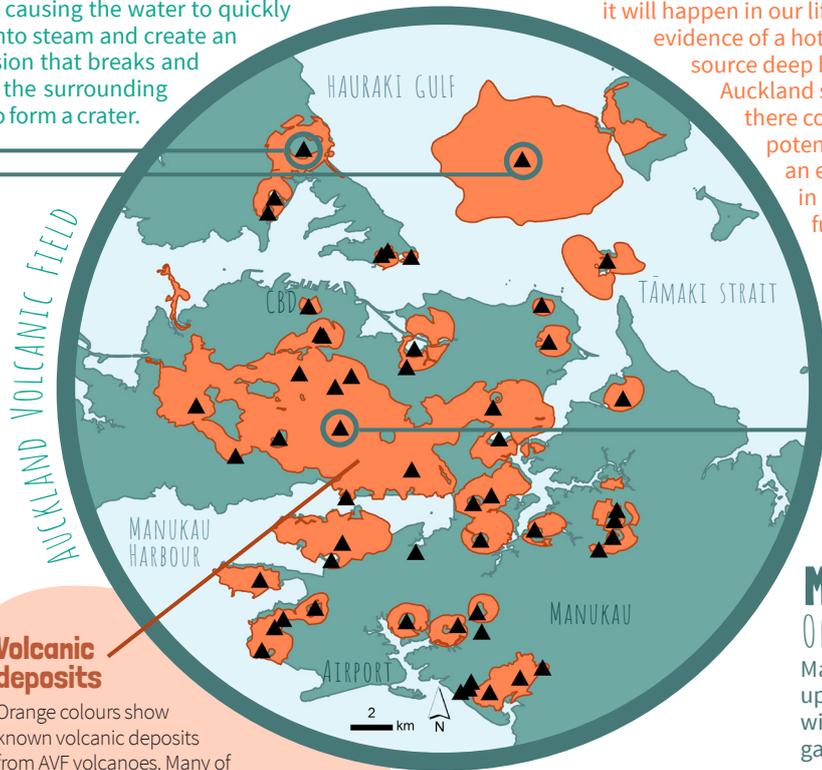
Pupuke

AUCKLAND'S OLDEST VOLCANO

Lake Pupuke is up to 200,000 years old. The lake was formed in a volcanic explosion crater that filled with water over time. Such explosion craters, called **maars**, form when hot rising magma comes into contact with water, causing the water to quickly heat into steam and create an explosion that breaks and ejects the surrounding rock to form a crater.

53 VOLCANOES

There are approximately 53 volcanoes in Auckland! Although it is unlikely that it will happen in our lifetime, evidence of a hot magma source deep beneath Auckland suggests there could potentially be an eruption in the future.



Volcanic deposits

Orange colours show known volcanic deposits from AVF volcanoes. Many of these deposits are buried by the city or the sea, so geologists interpret outcrops (rock exposures) and drill cores (rocks extracted from the ground) to estimate their extent.

Rangitoto

AUCKLAND'S YOUNGEST VOLCANO

Rangitoto's full name is Ngā Rangi-i-totongia a Tamatekapua, after a Maori captain who was wounded there. It experienced at least two eruptions about 600 years ago. Lava flows make up the volcano's broad slopes, and a **scoria cone** made of loose rock forms the cone shape at the top. **Lava tubes** can be found throughout Rangitoto. These tunnels were formed when the outer surface of the lava cooled and hardened before the inside, which continued to flow.



Scientists estimate the age of Auckland volcanoes by analysing the chemistry of the lava that they have erupted. This type of research shows the AVF is approximately 200,000 years old. There is no pattern in the location of eruptions over time. The oldest (Pupuke) and youngest (Rangitoto) volcanoes are only several km apart!

AVF: from magma to lava

surface

0 KM

When magma erupts at the surface, it is called **lava**. Lava may erupt fluidly, or be explosively erupted into fragments.

crust

30 KM

Once magma reaches the hard crust beneath Auckland it will start to break the rock, causing earthquakes.

mantle

80 KM

HOT MAGMA SOURCE

The small batches of magma released from the deep mantle will rise up towards the Earth's **crust** - a layer of hard, solid rock near the Earth's surface.

6,000 KM deeper to the centre of Earth

Magma refers to molten or partially molten rock beneath the surface. The AVF does not have one large magma chamber. Instead, its eruptions come from small magma batches that rise up from 80 km deep down in the Earth's mantle.

SCORIA



Maungakiekie

ONE TREE HILL

Maungakiekie is an example of a **scoria cone**. The cone is made up of basaltic **scoria** - a dark, iron-rich, fragmented volcanic rock with vesicles (holes). The vesicles were once filled with volcanic gasses, and indicate that the eruption was moderately explosive.

DID YOU KNOW?

Many of the volcanoes (**maunga**) were Māori pā sites, making up the largest network of defensible settlements in Polynesia. In 2014, 14 of the maunga were returned to iwi in a Treaty settlement and are now cared for by the Tūpuna Maunga Authority.

260 METRES ABOVE SEA LEVEL

220 METRES ABOVE SEA LEVEL

Auckland's youngest volcano is also its

LARGEST. Rangitoto is 10 times larger in volume than any other AVF volcano, and is taller than the viewing deck in the Auckland Skytower!