

Zealandia mapped: Scientists discover NZ-sized region of volcanic lava

By [Jamie Morton](#)

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P Kiwi scientists have revealed a gigantic region of volcanic lava – roughly the size of New Zealand – resulting from the hidden continent beneath us stretching “like pizza dough” over 40 million years.

The discovery is among several fascinating insights laid out in a new study defining the planet’s recently recognised eighth continent - Te Riu-a-Māui/Zealandia - while adding fresh evidence for the colossal break-up of the supercontinent Gondwana.

The paper, published in the scientific journal *Tectonics*, also marks the first time Zealandia – or any continent – has been mapped right out to its submarine edges.

Being nearly completely underwater – New Zealand represents the largest portion of it above sea level – what is the world’s youngest, smallest and thinnest continent is largely invisible to us.

But, if we drained the oceans, we could see it unfurling some five million sq km across the South Pacific.

For a relatively brief point in the Earth’s history its sprawling mass once stood above the waves, dispersing animals and plants from here to New Caledonia and the east of Australia.

Dinosaurs, including the towering titanosaurs, roamed its rolling, mountainless, low-lying landscape.

While scientific papers and reports spanning back more than a century hinted at its presence, it wasn’t until a ground-breaking GNS-led study in 2017 somehow made Zealandia a real place - and instantly captured the world’s attention.

Shortly before that study hit the press, an international team set sail on an expedition, funded by the Australian government and co-led by the University of Sydney, to obtain seabed rock samples near New Caledonia.

Six years later, GNS Science geologist Dr Nick Mortimer and fellow researchers have shared what they were able to learn from them – and about our planet’s wider tectonic history.

Having already mapped the geology of Zealandia’s 1.5 million sq km southern portion, the scientists turned to the north – particularly, the underwater region between New Zealand, New Caledonia and Australia.

Given all of Earth’s continents include submarine shelves that are mostly hidden underwater, defining their boundaries wasn’t simple – and even today, geological maps of the planet’s surface still have large grey areas.

In attempting to map Zealandia’s entirety, scientists faced an even tougher challenge – owing to the fact its continental shelves were even wider and more hidden than most, with only about five per cent of its mass peeking above water.

In the process, scientists uncovered something intriguing: a massive volcanic region thought to have ignited along the edge of the Gondwana supercontinent between 100 and 60 million years ago.

Until now, said study co-author and GNS scientist Dr Wanda Stratford, the role of magma in Gondwana breakup had been underestimated.

“We can now see these lavas cover an area of 250,000 km² across the continent - about the size of New Zealand itself.”

Mortimer added: “For the first time, we realise the extent of the magma eruptions of different ages imprinted across different parts of Zealandia.”

The freshly defined volcanic areas, hidden mostly underwater, were revealed by strong magnetic signatures picked up with seafloor surveys.

Interestingly, the same magnetic lava rocks found in this region could also be found on land here in New Zealand, in places near Cape Reinga, Blenheim, Hokitika and Ashburton, as well as in New Caledonia, the Chatham Islands and Auckland Islands.

These rocks, Mortimer said, were the result of Zealandia tearing away from Gondwana tens of millions of years ago – a period in which molten magma flooded out of cracks and fissures as the continent “stretched and thinned like pizza dough”.

The new study also highlighted Zealandia’s curving, 250 million-year-old “backbone”, comprised of ancient granite and extending some 4000km to New Caledonia.

Named Median Batholith, this backbone was finally able to be mapped using samples collected from Fairway Ridge near New Caledonia – and formed a key piece of Zealandia’s jigsaw.

But Mortimer, who’s been publishing research on Zealandia’s physical boundaries and composition for two decades, said the puzzle was far from complete.

“While the continent is the first to be completely mapped out to its submarine edges, much exploration and discovery remains - not just what is where, but when, how and why the major geological events that have shaped our continent took place.”

The new study, supported with a Government grant and a James Cook Fellowship, comes after GNS scientists [recently reconstructed Zealandia’s 100-million-year evolution in a series of new maps.](#)

Jamie Morton is a specialist in science and environmental reporting. He joined the *Herald* in 2011 and writes about everything from conservation and climate change to natural hazards and new technology.