Ocean's journey towards the center of the Earth

March 5 2009

A Monash geoscientist and a team of international researchers have discovered the existence of an ocean floor was destroyed 50 to 20 million years ago, proving that New Caledonia and New Zealand are geographically connected.

Using new computer modelling programs Wouter Schellart and the team reconstructed the prehistoric cataclysm that took place when a tectonic plate between Australia and New Zealand was subducted 1100 kilometres into the Earth's interior and at the same time formed a long chain of volcanic islands at the surface.

Mr Schellart conducted the research, published in the world-leading journal *Earth and Planetary Science Letters*, in collaboration with Brian Kennett from ANU (Canberra) and Wim Spakman and Maisha Amaru from Utrecht University in the Netherlands.

"Until now many geologists have only looked at New Caledonia and New Zealand separately and didn't see a connection, Mr Schellart said.

"In our new reconstruction, which looked at a much larger region including eastern Australia, New Zealand, Fiji, Vanuatu, New Caledonia and New Guinea, we saw a large number of similarities between New Caledonia and northern New Zealand in terms of geology, structure, volcanism and timing of geological events.

"We then searched deep within the Earth for proof of a connection and found the evidence 1100 km below the Tasman Sea in the form of a subducted tectonic plate.

"We combined reconstructions of the tectonic plates that cover the Earth's surface with seismic tomography, a technique that allows one to look deep into the Earth's interior using seismic waves that travel through the Earth's interior to map different regions.

"We are now able to say a tectonic plate about 70 km thick, some 2500 km long and 700 km wide was subducted into the Earth's interior.

"The discovery means there was a geographical connection between New Caledonia and New Zealand between 50 and 20 million years ago by a long chain of volcanic islands. This could be important for the migration of certain plant and animal species at that time," Mr Schellart said.

Mr Schellart said the new discovery diffuses the debate about whether the continents and micro-continents in the Southwest Pacific have been

completely separated since 100 million years ago and helps to explain some of the mysteries surrounding evolution in the region.

"As geologists present more data, and computer modelling programs become more hi-tech, it is likely we will learn more about our Earth's history and the processes of evolution."

Source: Monash University