

## Mount Etna's mystery explained?

October 7 2010



Dr. Wouter Schellart, Monash University, has developed a new theory of Earth dynamics. Credit: Monash University

Internationally renowned geophysicist Dr Wouter Schellart has developed the first dynamic model to explain the mystery of the largest and most fascinating volcano in Europe, Mount Etna.

Dr Schellart's results from fluid dynamic models provide an alternative explanation for the existence of Mount Etna, its geological environment and evolution, as well as volcanism in the surrounding region.

His theory suggests that Mount Etna is not directly the result of tectonic plate boundary activity, but that it resulted from decompression melting of upper <u>mantle</u> material flowing around the nearby edge of the Ionian slab that is slowly sinking into the Earth's mantle.



"Most volcanism on Earth occurs at plate boundaries in places where <u>tectonic plates</u> move apart (e.g. Iceland) and in places where tectonic plates come together with one plate diving (subducting) below the other plate into the mantle (e.g. Pacific ring of fire)," Dr Schellart said. "For the latter scenario, the volcanoes form directly above the subducted plate."

However, Dr Schellart said some volcanism, appropriately named intraplate volcanism, occurs far from plate boundaries and its origin is more controversial.

"The chemistry of the <u>volcanic rocks</u> from Mount Etna and the nearby Iblean volcanics in Sicily and in the surrounding seas indicate that they are intraplate volcanics. Interestingly, the volcanics are located within a few hundred kilometres of, but are laterally offset from, the Calabrian subduction zone plate boundary, where the African plate sinks below the Eurasian plate," Dr Schellart said.

"This suggests that the volcanics are somehow related to the Calabrian subduction zone."

"New modelling of subduction and <u>mantle flow</u> confirms this, showing that backward sinking of the African plate at the Calabrian subduction zone induced flow around the southern edge of the subducted plate and upward below Sicily," he said.

"The upward flow induced decompression melting of upper mantle material and these melts extruded at the surface in Sicily, forming Mount Etna and the Iblean volcanics," Dr Schellart said.

Until now there had been many explanations for Mount Etna and that of the surrounding volcanics, but none had been able to explain the timing, origin and dynamics of the activity.



"That's why Mount Etna has remained a mystery for so long," Dr Schellart said.

"The new research provides a dynamic explanation and completes the puzzle," he said Mount Etna is one of the most active volcanoes in the world and is in an almost constant state of activity. The most recent ash explosion occurred in August of this year, producing an ash plume that rose 800 meters above the crater edge.

The research was recently published in the journal Geology.

Provided by Monash University

Citation: Mount Etna's mystery explained? (2010, October 7) retrieved 28 April 2024 from <u>https://phys.org/news/2010-10-mount-etna-mystery.html</u>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.