Research helps to unlock key to Australian plate movement

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(PhysOrg.com) -- New UQ volcano research is helping to unlock the mystery surrounding one of the world's most important tectonic events.

The study, which forms part of an ongoing research team effort in the University's Argon Geochronology in Earth Sciences (UQ-AGES), has found a major collision between the Australia plate and Earth's largest oceanic plateau, the Ontong Java Plateau (OJP), in the South Pacific, happened about 26 million years ago.

Earth Sciences senior lecturer Dr Kurt Knesel said geologists had long theorised about the collision however, it was not clear how or when the event occurred because the deep oceanic evidence was so inaccessible.

The UQ researchers used new ages for volcanoes in eastern Australia to yield information about plate migration and uplift histories, not retrievable from already available data.

Dr Knesel said team member and former UQ PhD student Dr Ben Cohen also looked for volcanic remains on the seafloor that corresponded in time and space to their estimate of the plateau's arrival.

“Ben noticed bends in the middle of two different seamount chains – tracks of volcanoes on the ocean floor – off of eastern Australia,” he said.

“The chains were offset at the same time that the volcano migration

slowed on land, giving further evidence that the plateau arrived then and caused an abrupt westward plate excursion."

Dr Knesel said the research helped discover notable patterns in the northward drift of Australia.

He said more than 100 volcanic samples were used as a kind of speedometer for the drift of the Australian plate.

"We think the immense plateau, which is roughly the size of Greenland, blocked Australia's northerly movement – rapidly altering the pattern of volcanic activity between 26 and 23 Ma," he said.

"This momentous collision also initiated a dramatic plate reorganization.

"Before the collision, the Pacific plate was sinking or subducting below the Australian plate.

"However, the arrival of the plateau jammed and reversed this system, such that the Australian plate now sinks below the Pacific."

The UQ team also included Head of Earth Sciences Associate Professor Paulo Vasconcelos and research officer in the University of Queensland Argon Geochronology in Earth Sciences (UQ-AGES) laboratory Dr David Thiede.

The establishment of The University of Queensland Argon Geochronology in Earth Sciences laboratory was partly-funded by the Australian Research Council and funding for the current project was provided through UQ-AGES contract research and an Australian Postgraduate Award to Dr Cohen.

The team's research formed part of the article "Rapid change in drift of

the Australian plate records collision with Ontong Java plateau," recently published in the journal *Nature.*

Provided by University of Queensland