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Environment & Nature News - Remote corals reveal 100,000 year climate cycle - 16/01/2001

Remote corals reveal 100,000 year climate cycle

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The fossilised coral reefs of Henderson Island provide a unique climatic record. Pic: S.G. Blake

Geologists studying fossil corals from a remote Pacific Island have found new evidence for the Milankovitch theory, which says that climatic cycles are driven by variations in the Earth's orbit around the Sun occurring every 100,000 years.

Dr Claudine Stirling, formerly of the Research School of Earth Sciences at the Australian National University and now at the University of Michigan in the United States, worked with colleagues at the ANU and in Switzerland to analyse corals from Henderson Island - an uninhabited island in the Pitcairn group, about halfway between Australia and South America.

The corals provided rare supporting evidence for Milankovitch's prediction that the cycle of glacial and interglacial periods would occur about every 100,000 years.

The team's results are published in the current issue of *Science*.

Milutin Milankovitch, a Serbian astronomer of the early 1900s, explained fluctuations in climate by calculating slow changes in the tilt of the Earth's axis and its orbit around the Sun. The shape of the orbit is not perfectly circular, but changes from circular to elliptical about every 100,000 years, which corresponds with the cycle of glacial periods (ice ages) and warmer 'interglacials'.

The theory makes sense. But according to Professor Malcolm McCulloch, member of the Australian National University team, it is notoriously difficult to test.

"People have basically assumed that it is true," said McCulloch. "But it is especially difficult to test for more than the last cycle."

Coral reefs provide a valuable climatic record, because they grow faster when the climate is warmer and sea level is high. But good fossil specimens are rare.

Those on Henderson Island, though remote, are uniquely accessible. The island was uplifted during the volcanic eruption that formed nearby Pitcairn Island, pushing its fossil corals above the ocean's surface.

"The island popped up and took the reef with it," said fellow ANU team member Professor Kurt Lambeck. "If that hadn't happened, we would never have been able to do this work."

The island's dry climate has helped preserve the fossil corals, which are made of aragonite, a form of calcium carbonate that under wetter conditions transforms into calcite. This destroys the inbuilt uranium-decay 'clock' that scientists use to date the material.

When the research team dated the Henderson Island corals, they found evidence of coral growth from two different interglacial periods -- one around 330,000 years ago and one around 630,000 years ago. Both dates coincide with Milankovitch timing.

The Milankovitch theory is useful for helping to predict future climate, say the researchers.

"At the moment we're in an interglacial and due to move into a glacial period," said McCulloch. "If we weren't doing anything to our climate, we'd be heading into a new ice age within the next few thousand years. But now of course we have the greenhouse effect.

"To understand how we're changing climate, we need to understand the natural cycles first."

Rae Fry - ABC Science Online

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