Great Barrier Reef corals unveil sea level and climate changes

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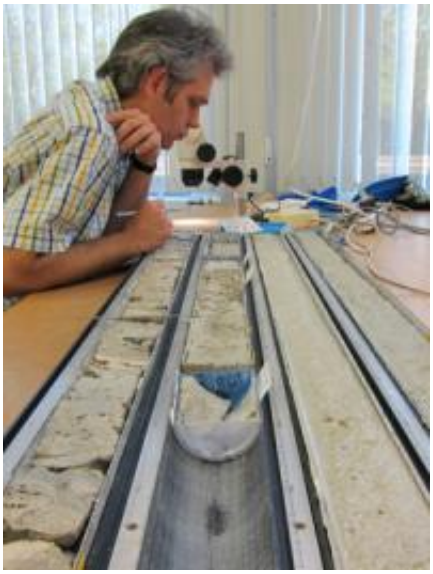

Researchers examining the fossil coral reef cores have found climate change has not been smooth and continuous.

(PhysOrg.com) -- Groundbreaking preliminary findings from the Great Barrier Reef show climate change has not been smooth and continuous but may have been characterised by several rapid changes.

A team of international scientists, including Dr Jody Webster from the University of Sydney, have taken part in a groundbreaking voyage to the Great Barrier Reef between February to April this year to acquire fossil coral reef cores from the edge of the continental shelf.

The team has discovered the fossil reef that grew from the last Ice Age when global sea levels and climate were very different from today. The team, led by co-chief scientists Dr Webster, and Dr Yusuke Yokoyama from the University of Tokyo, have now begun investigating these cores and their unique archive of past sea-level and climate change and how the Great Barrier Reef responded to these major environmental changes.

The Great Barrier Reef Environmental Changes Expedition (GBREC) is the only expedition in Australian waters that forms part of the Integrated Ocean Drilling Program (IODP), which is a multi-million dollar international collaboration with US, Europe, Japan , Australia, New Zealand, China, and India, that explores Earth's history and structure as it is recorded in seafloor sediments and rocks, and sub-seafloor environments.

The preliminary findings from the IODP Onshore Science Party held in Bremen, Germany in July unveiled fossil coral reefs up to 30,000 years old and showed how the reef ecosystem responded to rapid rises of sea level and changes in climate.

The investigation team recovered more than 225 metres of material from 34 holes at three key geographical locations on the outer edge of the Great Barrier Reef.

The Great Barrier Reef is a significant site for the expedition because it is a tectonically inactive area situated a long way from glaciated regions that might bias global sea level reconstructions.

"The Great Barrier Reef is on a tectonically stable portion of the Earth's crust and is a prime location to investigate sea level changes over the last 20,000 years including the final phase of the last ice age," Dr Webster said.

"Coral reefs are excellent sea-level indicators, and their accurate dating by mass spectrometry is critical for constraining the timing, rate and amplitude of deglaciation events."

Although the investigations deal with past events in Earth history they can be very important to our understanding of how the modern Great Barrier Reef, a World Heritage Site since 1980, will respond to future changes.

Analysis of the cores will provide important insights into how robust the reef is over different timescales and under different environmental conditions and stresses such as changing sea level and sea-surface temperatures, changing sediment input and ocean chemistry.

"The expedition has provided us with a truly unique opportunity to test ecologic theories about coral reef resilience and the vulnerability of the Great Barrier Reef to future climate change," Dr Webster said.

A preliminary report of the GBREC Expedition is due to be released in the next six to eight weeks. A more detailed report of the expedition and scientific papers concerning the findings will be released later next year.

Provided by University of Sydney