

Ocean scientists look into the past to predict Australia's climate future

October 1 2015, by Crystal Ja



Expedition co-chief Stephen Gallagher, from the University of Melbourne, takes a closer look at sediment samples taken from beneath the seabed.

Has Australia's climate always been so dry? Have the tropical reefs around Australia always been there? What will happen to Australia's climate and reefs in the future?

The answers lie deep under the ocean, millions of years into the past.

A group of leading international scientists have today concluded a two-month research expedition off the coast of Western Australia where they have been drilling into the seabed to gain valuable insight into our [climate](#) future.

The \$20 million International Ocean Discovery Program (IODP) Indonesian Throughflow Expedition 356 was the first ever expedition of the entire western coast of Australia to examine climatic conditions of the past five million years.

Expedition 356 has spent the past two months traversing coastal waters between Fremantle and Darwin in a bid to reveal the untold secrets of the Indonesian Throughflow, the Leeuwin Current and the Australian monsoon.

Prior to this trip, similar records of Australia's climate history dated back less than half a million years. But this expedition has extended that record to five million years at most coring sites – and unexpectedly, to 12 million and 50 million at another two locations.

With help from professional drill operators, the team took samples by coring up to one kilometre beneath the seabed at seven different sites.

University of Melbourne palaeoceanographer Associate Professor Stephen Gallagher was one of two co-chiefs leading more than 100 [international scientists](#) and crew aboard the high-tech JOIDES Resolution research vessel, the world's most prolific scientific drillship.

Formerly an oil exploration vessel, the JOIDES Resolution has completed over 150 expeditions since 1985.

Three more scientists from the Australia and New Zealand IODP Consortium (ANZIC) made up the crew, which also included researchers from Norway, Austria, USA, Germany, Brazil, China, Sweden, Japan, the UK and the Netherlands.

"The history of Australia's climate is strongly linked to oceanic conditions off its coastline. By studying ancient marine sediment, we can see how these currents have changed through earth's history, and how that affected the climate of Australia," Associate Professor Gallagher said.

"By looking at the causes and effects of past [climatic conditions](#), we can also better understand future ones."

Associate Professor Gallagher says the layers beneath the seabed contain rock and shells that reveal crucial information about how environmental conditions have changed over time, much like how tree rings tell a story about the climate of a forest.

He says his team of researchers had an excellent recovery rate during the expedition, having sampled over five kilometres of sediment core. Some samples were up to 50 million years old.

A preliminary scientific report will be published within two months.

"We have found sediments and microfossils related to ancient coral reefs, beaches, deep and shallow water and even areas which were once above sea level," Associate Professor Gallagher said.

Professor Neville Exon heads up the Australian office of the ANZIC

consortium. He says these expeditions provide huge leaps forward in understanding how our planet works.

"Oceans comprise 70 per cent of the Earth's surface. The International Ocean Discovery Program's studies of the sediments and rocks in the world's oceans tackle the 'big science' questions like climate change, plate tectonics and geological hazards," Professor Exxon said.

"We will be really excited to see the results from the Indonesian Throughflow Expedition. We hope that we can answer some of the big questions about Australia's climate past and future and will certainly find a few surprises along the way."

Provided by University of Melbourne

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