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Antarctica's Past Revealing Earth's Future

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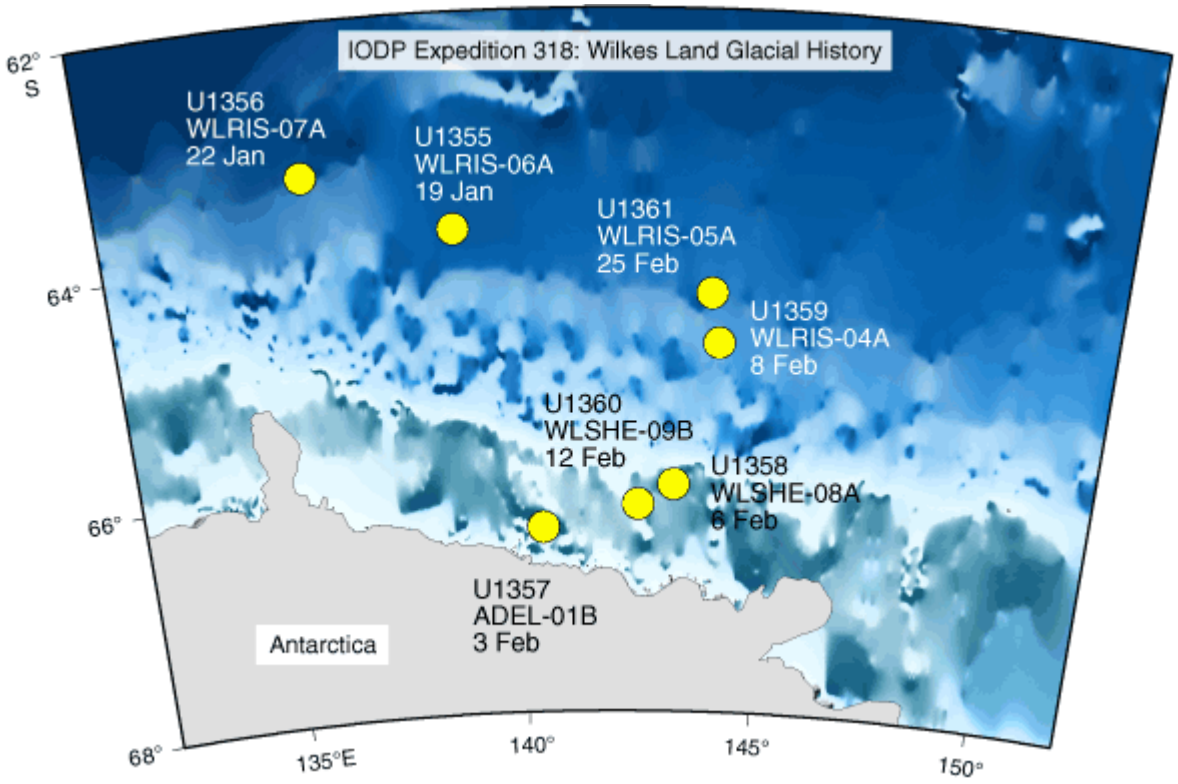
Published on May 3rd, 2010 in **Environmental & Climate Science**



New sediment cores taken from the seabed in Antarctica may give us clues as to our planet's future climate.

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Scientists participating in the Wilkes Land Glacial History expedition of the Integrated Ocean Drilling Program have recently returned home with 2,000 metres of sediment core from Wilkes Land, directly south of Australia, in an effort to add more data to global climate models.

Climate records retrieved from the sediment cores revealed information about Antarctica's past, showing that some 53 million years ago Antarctica was not the icy wasteland that it is today but rather a warm, sub-tropical environment in a world where atmospheric levels of CO2 exceeded those of today by ten times.

However, within 400,000 years Antarctica underwent a transformation which turned it into the massive ice-sheet that we are more familiar with. Such a dramatic transformation happening within such a small period of time – geologically speaking – reveals a dramatic stimulus. Global temperatures dropped and Antarctica became icebound.

How this happened and whether such an event can provide information for us as we move forward was the push for the Wilkes Land Glacial History Expedition, a several month journey from New Zealand, via Hobart and south to the Wilkes Land margin off the coast of Antarctica.

The expedition, aboard the vessel JOIDES Resolution, acquired geological samples from the sea bed as the crew avoided icebergs, near gale-force winds and fog. The sediments they acquired "are essential to our research because they preserve the history of the Antarctic ice-sheet," said Dr. Carlota Escutia of the Research Council of Spain CSIC-University of Granada.

"We can read these sediments like a history book," explained co-chief scientist Dr. Henk Brinkhuis of Utrecht University in the Netherlands. "And this book goes back 53 million years, giving us an unprecedented record of how ice sheets form and interact with changes in the climate and the ocean."

The Wilkes Land region of Antarctica is special in that it is one of the more climate-sensitive regions on the face of the planet. This allowed the scientists to withdraw cores that provide the first ever document evidence of the waxing and waning of the ice-sheet spared and its effect on the region's albedo and the planet's water levels.

The cores tell the story of Antarctica's transition from a hot and humid locale to the ice-bound desert that has been the centre of so much human attention.

Sediments and microfossils found within the cores document the beginning of the cooling and the development of Antarctica's first glaciers and subsequent growth and spread of the ice-sheets. Cores from one specific site are reminiscent of the rings within a trees trunk, alternating dark and light sediment preserving seasonal variability of the last deglaciation that began some 10,000 years ago.

More and more information is always beneficial to helping climate scientists understand what is going to happen to Earth next. More information equals more robust and effective climate models which are used to predict the future of our planet's climate.

"These models rely on constraints imposed by data from the field," the co-chiefs pointed out. "Measurements of parameters such as age, temperature, and carbon dioxide concentration provide invaluable inputs that help increase the accuracy of these models. The more we can constrain the models, the better they'll perform and

the better we can predict ice sheet behaviour.”

Source: **Integrated Ocean Drilling Program Management International**

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