

Fossil wood gives vital clues to ancient climates

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New research into a missing link in climatology shows that the Earth was not overcome by a greenhouse period when dinosaurs dominated, but experienced rapid fluctuations in temperature and sea level change that resulted in a balance of the global carbon cycle. The study is being published in the March issue of *Geology*.

"Most people think the mid-Cretaceous period was a super-greenhouse," says Darren Gröcke, assistant professor and Director of the Stable Isotope Biogeochemistry Laboratory at McMaster University. "But in fact it was not too dissimilar to the climates over the past 5 million years."

By using high-resolution stable-isotope analysis from 95-million-year-old fossilized wood collected from Nebraska, Gröcke and his team were able to precisely correlate the terrestrial carbon cycle with that from deep-sea records. However, when they compared the carbon curves from both records, it was evident that a chunk of about 500,000 years was missing from the terrestrial record. Other records already indicated a drop in sea level, a 2-4°C drop in oceanic temperature and a breakdown in oceanic stratification coincident with a marine extinction event.

"Rapid, large falls in sea-level in the ancient record are typically only produced by a glaciation, and so the combination of all the data during the mid-Cretaceous period suggests a short-lived glaciation during a period generally considered to be a super-greenhouse," says Gröcke.

"Whatever hits the water causes a ripple effect on land," says Gröcke.

"Earth often undergoes rapid temperature fluctuations, and this new information may help us to understand how the biosphere will respond to human-generated alterations of CO₂ concentration."

He said the research not only challenges conventional wisdom surrounding ancient climates, it makes a case for the use of high-resolution sampling in order to reconstruct a more accurate picture of the ancient climate and its affect on the Earth.

Source: McMaster University

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