UC SANTA BARBARA

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Gail Gallesich Brown

New Report Explains Ice-Age Mystery, Furthers Climate Change Studies

University of California researchers have solved a longstanding mystery for scientists trying to understand how Earth's climate can quickly shift between cold and warm modes.

The mystery revolves around the source of a rapid change in the geochemistry of oceanic carbon that occurred just as the last ice age ended, between 16,000 and 20,000 years ago.

Based on analyses of carbon stored in tiny fossil seashells, the UC geologists suggest that the chemical change occurred because of dramatic shifts in ocean circulation. They have developed a timeline of events that can be linked to previously described changes recorded in the ocean, in Antarctic ice cores and on the continents.

Climate-change experts say these changes reflect the types of events that could occur because of global warming related to human activities.

An explanation of the mystery and details of the timeline will appear in the April 19 issue of the journal Science in an article titled, "The Cause of Carbon Isotope Minimum Events on Glacial Terminations." The authors are geology professors

Howard Spero of UC Davis and David Lea of UC Santa Barbara.

"The importance of our article is that it links the rise in atmospheric dioxide at the end of the last ice age to oceanic changes recorded in deep-sea sediments, including the coincident warming of the tropical oceans," said Lea. "This link will enable us to better establish the relationship between changes in atmospheric carbon dioxide and global climate change."

"An understanding of the relative timing of this event is critical because the greenhouse gases that humans are producing are likely to affect not only the warming of the atmosphere but also the circulation of the oceans," Spero said. "Changes in atmospheric temperature can have immense effects on the flow of the deep ocean currents, which in turn can affect weather and climate worldwide.

"Understanding the order of events that occurred when Earth warmed quickly in the past can help us model what might happen if the Earth continues to warm into the future."

Spero and Lea have a long collaboration in using chemical analyses of foraminifera shells to reconstruct Earth's climate. This study was funded by the U.S. National Science Foundation and the Hanse Institute for Advanced Study. The Hanse Institute, or Hanse Wissenschaftskolleg, is a non-profit private foundation of the German states of Lower Saxony and Bremen and the city of Delmenhorst.

About UC Santa Barbara

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