

Research challenges models of sea level change during ice-age cycles

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Theories about the rates of ice accumulation and melting during the Quaternary Period -- the time interval ranging from 2.6 million years ago to the present -- may need to be revised, thanks to research findings published by a University of Iowa researcher and his colleagues in the 12 February issue of the journal *Science*.

Jeffrey Dorale, assistant professor of [geoscience](#) in the UI College of Liberal Arts and Sciences, writes that [global sea level](#) and Earth's climate are closely linked. Data he and colleagues collected on speleothem encrustations (see photo right), a type of mineral deposit, in coastal caves on the [Mediterranean island](#) of Mallorca indicate that sea level was about one meter above present-day levels around 81,000 years ago. The finding challenges other data that indicate sea level was as low as 30 meters -- the ice equivalent of four [Greenland](#) ice sheets -- below present-day levels.

He said the sea level high stand of 81,000 years ago was preceded by rapid ice melting, on the order of 20 meters of sea level change per thousand years and the sea level drop following the high water mark, accompanied by ice formation, was equally rapid.

"Twenty meters per thousand years equates to one meter of sea level change in a 50-year period," Dorale said. "Today, over one-third of the world's population lives within 60 miles of the coastline. Many of these areas are low-lying and would be significantly altered -- devastated -- by a meter of sea level rise. Our findings demonstrate that changes of this

magnitude can happen naturally on the timescale of a human lifetime. Sea level change is a very big deal."

Dorale also noted that although their findings disagree with some sea level estimates, such as those from Barbados and New Guinea that come from ancient [coral reefs](#), they are in agreement with data gathered from other sites such as the Bahamas, the U.S. Atlantic coastal plain, Bermuda, the Cayman Islands and California.

"There has been a long-standing debate on this issue, but our data is pretty robust," he said. "The key to our research is two-fold. First, the speleothem approach we employed is novel and extremely precise compared to other methods of [sea-level](#) reconstruction. Second, Mallorca appears to be particularly well suited to the task, because neither tectonics nor isostasy -- geological forces of crustal motion -- over-complicate the record. It's really close to the ideal scenario. It's also a heck of a nice place to do fieldwork."

Dorale's colleagues include Bogdan Onac of the University of South Florida, Tampa; Joan Fornos, Joaquin Gines and Angel Gines, all of the Universitat de les Illes Balears, Mallorca, Spain; Paola Tuccimei of the University of Rome III, Italy; and UI associate professor of geoscience David Peate.

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Provided by University of Iowa

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