

Signs of climate change and adaptation in the ancient Maya lowlands

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Credit: AI-generated image ([disclaimer](#))

A new study pinpoints the devastating effects of climate change on ancient Maya civilization, despite attempts to adapt to it.

Researchers found that markers of historic droughts in Central America match the patterns of disruption to Maya society during centuries of

hardship. The new information provides answers to longstanding questions about the role [climate change](#) played in Maya cultural collapse between 800 and 950 A.D.

"Our work demonstrates that the southern Maya lowlands experienced a more severe [drought](#) compared to the north," said Mark Pagani, a Yale University professor of geology and geophysics and co-author of the study, published April 20 in the *Proceedings of the National Academy of Sciences*. Pagani is also the director of the Yale Climate and Energy Institute.

"The south was the center of the Maya population, and their capacity to adapt was limited," Pagani explained. "The north was already accustomed to fairly dry conditions and did much better. There was actual expansion there after the collapse, but the southern cities never recovered."

Indeed, evidence of Maya resilience and efforts to adapt to climate change also emerged in the research. Pagani and his colleagues, including first author Peter Douglas, now at the California Institute of Technology, argue that a change in maize production during an earlier period of drought allowed populations to continue to grow. The dominant agricultural technique shifted from swidden—a method of clearing land by slashing and burning—to a more intensive and concentrated system of crop production.

The research team looked at hydrogen and carbon isotopes in leaf waxes from two lake sediment cores in Mexico's northern Yucatan region and in Guatemala. The hydrogen isotopes enabled the team to study drought and precipitation amounts, while the carbon isotope signatures provided insights into agricultural methods.

"The research makes clear that the ancient Maya were not passive

victims of climate change—they adapted in response to drought, but it only worked up to a point," Douglas said.

"This highlights the importance of taking a long-term perspective in adapting to future climate change, especially considering predictions of very severe climate impacts in the latter part of this century and beyond," Douglas added.

More information: "Drought, agricultural adaptation, and sociopolitical collapse in the Maya Lowlands" *PNAS* 2015 ; published ahead of print April 20, 2015, [DOI: 10.1073/pnas.1419133112](https://doi.org/10.1073/pnas.1419133112)

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