

Oldest record of human-caused lead pollution detected

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Humans began contributing to environmental lead pollution as early as 8,000 years ago, according to a University of Pittsburgh research report.

The Pitt research team detected the oldest-discovered remains of human-derived lead pollution in the world in the northernmost region of Michigan, suggesting [metal pollution](#) from mining and other human activities appeared far earlier in [North America](#) than in Europe, Asia, and [South America](#). Their findings are highlighted on the cover of the latest issue of *Environmental Science & Technology*.

"Humanity's environmental legacy spans thousands of years, back to times traditionally associated with hunter-gatherers. Our records indicate that the influence of early Native Americans on the environment can be detected using lake sediments," said David Pompeani, lead author of the research paper and a PhD candidate in Pitt's Department of Geology and Planetary Science. "These findings have important implications for interpreting both the archeological record and environmental history of the upper Great Lakes."

The University of Pittsburgh research team—which included, from Pitt's Department of Geology and Planetary Science, Mark Abbott, associate professor of paleoclimatology, and Daniel Bain, assistant professor of catchment science, along with Pitt alumnus Byron A. Steinman (A&S '11G)—examined Michigan's Keweenaw Peninsula because it is the largest source of pure native copper in North America. Early surveys of the region in the 1800s identified prehistoric human mining activity in

the form of such tools as hammerstones, ladders, and pit mines.

The team from the Department of Geology and [Planetary Science](#) investigated the timing, location, and magnitude of ancient copper mining pollution. Sediments were collected in June 2010 from three lakes located near ancient mine pits. They analyzed the concentration of lead, titanium, magnesium, iron, and organic matter in the collected sediment cores—finding distinct decade- to century-scale increases in lead pollution preserved from thousands of years ago.

"These data suggest that measurable levels of lead were emitted by preagricultural societies mining copper on Keweenaw Peninsula starting as early as 8,000 years ago," said Pompeani. "Collectively, these records have confirmed, for the first time, that prehistoric pollution from the Michigan Copper Districts can be detected in the sediments found in nearby lakes."

By contrast, reconstructions of metal pollution from other parts of the world, such as Asia, Europe, and South America, only provide evidence for lead pollution during the last 3,000 years, said Pompeani.

"We're hopeful that our work can be used in the future to better understand past environmental changes," said Abbott.

The team is currently investigating places near other prehistoric copper mines surrounding Lake Superior.

More information: The research paper, "Lake Sediments Record Prehistoric Lead Pollution Related to Early Copper Production in North America," was first published online May 14 in *Environmental Science and Technology*.

Provided by University of Pittsburgh

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