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Ancient Warming Caused Huge Spike in Temps, Study Says

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for [National Geographic News](#)

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What started out as a moderate global warm-up about 55 million years ago triggered a massive injection of greenhouse gases into the atmosphere that sent temperatures skyrocketing, a new study says.

The finding suggests that today's temperature rise may just be priming the planet for a carbon belch of epic proportions.

"You've got these feedbacks, these chain reactions of events in the atmosphere-ocean system," said Appy Sluijs, a paleoecologist at Utrecht University in the Netherlands.

Sluijs and his colleagues found evidence for the chain reaction in two sections of sediment that accumulated on an ocean floor in what is now New Jersey.

The abundance and distribution of marine algae indicate the environment started to change and the ocean surface began to warm several thousand years before the large temperature spike.

The finding implies that the earlier warming triggered the injection of greenhouse gases visible in the geological record around 55 million years ago.

"That's actually the first time we can see that in such a clear fashion," Sluijs said.

The study appears in tomorrow's issue of the journal *Nature*.

"Swampy" Arctic

Scientists have long studied the ancient temperature spike, called the Paleocene-Eocene thermal maximum or PETM, for clues to what could happen as a result of today's [global warming](#).

Research shows that during the PETM, global temperature shot up at least 9 degrees Fahrenheit (5 degrees Celsius), and swamp forests with redwoods and broad-leaved trees filled the Arctic.

A key unanswered question is what—if anything—triggered the substantial warming, noted Scott Wing, a paleobiologist at the Smithsonian Institution in Washington, D.C., who was not involved in the new research.

One theory is that the meltdown of methane hydrates—icelike deposits that store massive amounts of potent greenhouse gases in the seafloor—was responsible.

According to the new study, pre-warming triggered the melt, releasing greenhouse gases into the atmosphere. Less clear is the nature of that pre-warming, study author Sluijs said.

One possibility, he pointed out, is [a bout of volcanic activity that ripped Greenland from Europe](#), a theory proposed earlier this year in the journal *Science*.

Hydrate Meltdown

Today Earth is also experiencing global warming, which scientists believe is largely driven by the burning of fossil fuels like coal and oil.

This warming could force a meltdown of hydrates on the seafloor as well, releasing methane into the ocean-atmosphere system.

"We really should know whether the [carbon dioxide] that's being added to the atmosphere now has the potential to generate some kind of unanticipated cascade of events," Wing, the Smithsonian biologist, said.

Though the *Nature* study does not solve the question, he added, scientists now have more reason "to start to worry about these kinds of unanticipated changes."

Hydrate deposits contain approximately as much greenhouse gases as will be released from current and projected emissions from fossil fuels, Sluijs pointed out.

"We are just at the beginning of the modern climate change," he said. "We are able to stop it, or at least keep the damage minor.

"But if we are going to keep burning fossil fuels for the next couple of centuries, then yes ... definitely at a certain point you will dissociate the methane hydrates, without a doubt."

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