

# Earth's interior cycles contributor to long-term sea-level and climate change, scientists conclude

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German researchers at the University of Bonn said that the world is smaller than first thought.

Ancient rises in sea levels and global warming are partially attributable to cyclical activity below the earth's surface, researchers from New York University and Ottawa's Carleton University have concluded in an analysis of geological studies.

However, the article's authors, NYU's Michael Rampino and Carleton University's Andreas Prokoph, note that changes spurred by the earth's interior are gradual, taking place in periods ranging from 60 million to 140 million years—far less rapidly than those brought on by human activity.

Their analysis appears in *Eos*, a newspaper published by the [American Geophysical Union](#).

Rampino and Prokoph's analysis considers long-term fluctuations in [global climate](#), diversity of [marine organisms](#), and sea level changes, aiming to identify a unifying cause for these changes. While much scientific study has centered on phenomena above the earth's crust, less attention has historically been paid to changes deep inside our planet.

In recent years, however, researchers have examined the upwelling of [mantle plumes](#)—the rising up of heated rocks from earth's mantle that reach the earth's surface. These plumes have a notable impact on one geologic occurrence: the eruption of large igneous provinces (LIPs), which are large accumulation of rocks formed from congealed lava.

In their analysis of recent scientific findings, Rampino and Prokoph observe that mantle plumes coincide with cyclical surface changes, suggesting that the plumes themselves may be cyclical in nature. For example, Prokoph's previous research has found that many geological changes had cycles of 60 and 140 million years and suggested the cyclical uprising of these plumes to form hotspots—areas on the earth's surface where volcanic activity has endured.

More broadly, the researchers write, mantle plumes push up against the earth crust, shifting water to continents, thereby producing [sea-level](#) rise, and precipitating volcanic activity, which produces additional CO<sub>2</sub>, leading to a warmer climate.

"Mantle plumes appear to show regular cycles," Rampino explained. "So what's remarkable is there is a strong indication of a connection between changes on the earth's surface—such as [volcanic activity](#) and rising sea levels—and what's occurring deep inside the earth. This suggests a fascinating and powerful union between below-surface geological events and changes in our climate."

Provided by New York University

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