

Simulations of Massive Ancient Volcanic Eruption Show Unexpected Climate Warming



A cloud of volcanic ash and gas rises above Mount Pinatubo, Philippines, on June 12, 1991. The NASA-simulated volcano released about 1,500 times as much sulfur dioxide into the atmosphere as the Pinatubo eruption. Photo by Dave Harlow, U.S. Geological Society.

Volcanic flood basalt eruptions are linked to mass extinctions and climate change through Earth's history. A recent study used modeling experiments to show that a massive release of sulfur dioxide can produce warming through climate feedbacks.

- A team of researchers used the Goddard Earth Observing System Chemistry-Climate Model (GEOSCCM) to simulate the aftermath of an ancient, massive volcanic eruption that occurred 15 to 17 million years ago in the Columbia River basalt Group region of the US Pacific NW.
- They found an unexpected climate warming response: Based on modern volcanic eruptions, scientists were expecting a large emission of sulfur dioxide to produce intense climate cooling. But while the climate cooled briefly in the simulations,

it was then overwhelmed by intense climate warming. After some study, the team determined this was due to a secondary effect of the eruption: a thousand-fold increase in stratospheric water vapor, which acted as a greenhouse warming agent. These results provide a different viewpoint from the “volcanic winter” paradigm.