

# India's smoking gun: Dino-killing eruptions

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New discoveries about the timing and speed of gigantic, 6500-foot (2-km) thick lava flows that poured out of the ground 65 million years ago could shift the blame for killing the dinos.

The Deccan Traps of India are one of Earth's largest lava flows ever, with the potential of having wreaked havoc with the climate of the Earth - if they erupted and released climate-changing gases quickly enough. French and Indian geologists have now identified a 600-meter (2000-foot) thick portion of the lava that may have piled up in as little as 30,000 years - fast enough to have possibly caused a deadly global climate shift.

"Our working hypothesis is that the majority of the total volume of lava might have been erupted in only a few major events spread over only a small fraction of millennia," said Anne-Lise Chenet of the Laboratoire de Paleomagnetisme, Institut de Physique du Globe de Paris (IPGP).

To test that hypothesis, the researchers have combined already known ages of the traps gathered from radiometric dating with magnetic fields frozen in the rocks. Volcanic rocks record information about the Earth's magnetic field with magnetic minerals that align with Earth's field like millions of tiny compasses before the lava cools. When the lava solidifies, the compasses are locked in place.

Lava layers that erupted within two or three centuries of each other will record similar magnetic fields, explains Chenet. Longer than that and the natural changes in Earth's magnetic field start to show up. The team also

incorporated information about the lava's chemistry, the way it flowed and piled up and the red weathered soils between lava layers to estimate the timing and number of major volcanic pulses.

All that information points to the 600 meters (2000 feet) of lava pouring out in as little as 30,000 years. This is enough to have possibly released a climate-altering amount of sulfur gases, says Chenet. An estimate of just how much gas is still being worked out.

Chenet is scheduled to present the latest results of the team's work on Wednesday, 10 August, at Earth System Processes 2, a meeting co-convened by the Geological Society of America and Geological Association of Canada this week in Calgary, Alberta, Canada.

Chenet and her colleagues' new work on the Deccan Traps is just the latest in a series of discoveries which appear to weaken the case implicating the Chicxulub impact as the primary player in the Cretaceous-Tertiary (K-T) mass extinction.

"As originally proposed by Vincent Courtillot in 1986, the volcanism might be a key player in mass extinctions," said Chenet. "Research in India has shown the remnants of the impact - iridium in sediments - sandwiched between lava flows, implying that volcanism started before the impact."

In fact, most mass extinctions over the past 300 million years have coincided with large volcanic events, said Chenet. The general rule is that massive volcanism like the Deccan Traps correlates with all major mass extinctions in Earth's history, she said.

"In only one case is there evidence for both volcanism and impact," she said. And that is the K-T mass extinction that ended the reign of the dinosaurs. "Our view is that impact added to the stress already generated

by an ongoing massive eruption, enhancing significantly the extent of the extinction, which would however have taken place even if the impact had not occurred."

Wiped out in the K-T mass extinction were 80-90% of marine species and about 85% of land species. All land animals larger than 25 kg (55 lbs) were obliterated.

The Deccan Traps are a huge pile of basaltic lava extending over more than 500,000 square kilometers. Its original volume likely exceeded 2 to 3 million cubic kilometers, says Chenet. The entire volcanic episode that created the traps took place over about one million years. The source of the massive lava flows is thought to have been the surfacing of a plume of hot material from deep in the Earth's mantle.

Source: Geological Society of America

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