

# Earth's massive extinction: The story gets worse

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Dr. Hamed Sanei analyzes chemical records of the sedimentary rocks deposited during the Latest Permian Extinction event. Dr. Sanei is a research scientist with Natural Resources Canada and an adjunct professor at the University of Calgary. Credit: University of Calgary/Riley Brandt.

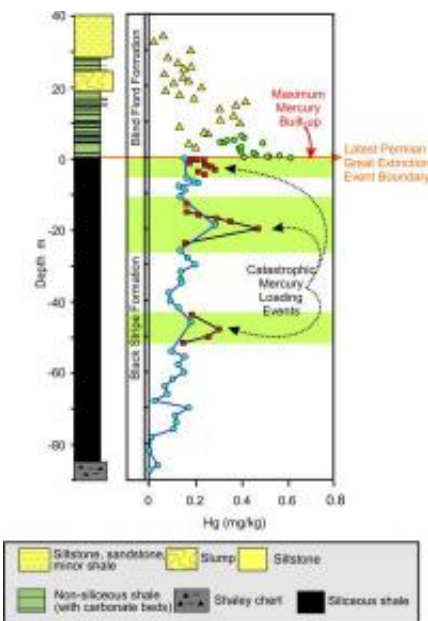
Scientists have uncovered a lot about the Earth's greatest extinction event that took place 250 million years ago when rapid climate change wiped out nearly all marine species and a majority of those on land. Now, they have discovered a new culprit likely involved in the annihilation: an influx of mercury into the eco-system.

"No one had ever looked to see if mercury was a potential culprit. This was a time of the greatest volcanic activity in Earth's history and we know today that the largest source of mercury comes from [volcanic eruptions](#)," says Dr. Steve Grasby, co-author of a paper published this

month in the journal *Geology*. "We estimate that the mercury released then could have been up to 30 times greater than today's [volcanic activity](#), making the event truly catastrophic." Grasby is a research scientist at Natural Resources Canada and an adjunct professor at the University of Calgary.

Dr. Benoit Beauchamp, professor of geology at the University of Calgary, says this study is significant because it's the first time mercury has been linked to the cause of the massive extinction that took place during the end of the Permian.

"[Geologists](#), including myself should be taking notes and taking another look at the other five big extinction events," says Beauchamp, also a co-author.



This graphic shows historical variations of Mercury (Hg) deposition before and after the Latest Permian Extinction event as recorded in a sedimentary section in the High Arctic, Canada. The vertical axis demonstrates the depth of the sedimentary section relative to the extinction boundary while the horizontal looks at the amount of mercury accumulation (concentration in the rock) as measured

in milligram per kilogram. Credit: Hamed Sanei, Steve Grasby and Benoit Beauchamp. (Sanei et al., 2012, *Geology*).

During the late Permian, the natural buffering system in the ocean became overloaded with mercury contributing to the loss of 95 per cent of life in the sea.

"Typically, algae acts like a scavenger and buries the mercury in the sediment, mitigating the effect in the oceans," says lead-author Dr. Hamed Sanei, research scientist at Natural Resources Canada and adjunct professor at the University of Calgary. "But in this case, the load was just so huge that it could not stop the damage."

About 250 million years ago, a time long before dinosaurs ruled and when all land formed one big continent, the majority of life in the ocean and on land was wiped out. The generally accepted idea is that volcanic eruptions burned through coal beds, releasing CO<sub>2</sub> and other deadly toxins. Direct proof of this theory was outlined in a paper that was published by these same authors last January in *Nature Geoscience*.

The mercury deposition rates could have been significantly higher in the late Permian when compared with today's human-caused emissions. In some cases, levels of mercury in the late Permian ocean was similar to what is found near highly contaminated ponds near smelters, where the aquatic system is severely damaged, say researchers.

"We are adding to the levels through industrial emissions. This is a warning for us here on Earth today," adds Beauchamp. Canada has taken a lead role in reducing emissions internationally. In North America, at least, there has been a steady decline through regulations controlling [mercury](#).

No matter what happens, this study shows life's tenacity. "The story is one of recovery as well. After the system was overloaded and most of life was destroyed, the oceans were still able to self clean and we were able to move on to the next phase of life," says Sanei.

Provided by University of Calgary

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