

# The world's oldest crater from a meteorite isn't an impact crater after all

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Credit: NASA

Several years after scientists discovered what was considered the oldest crater a meteorite made on the planet, another team found it's actually the result of normal geological processes.

During fieldwork at the Archean Maniitsoq structure in Greenland, an

international team of scientists led by the University of Waterloo's Chris Yakymchuk found the features of this region are inconsistent with an [impact crater](#). In 2012, a different team identified it as the remnant of a three-billion-year-old meteorite crater.

"Zircon crystals in the rock are like little time capsules," said Yakymchuk, a professor in Waterloo's Department of Earth and Environmental Sciences. "They preserve ancient damage caused by shockwaves you get from a meteorite impact. We found no such damage in them."

Additionally, there are multiple places where the rocks melted and recrystallized deep in the Earth. This process—called metamorphism—would occur almost instantaneously if produced from an impact. The Waterloo-led team found it happened 40 million years later than the earlier group proposed.

"We went there to explore the area for potential mineral exploration, and it was through close examination of the area and data collected since 2012 that we concluded the features are inconsistent with a meteorite impact," Yakymchuk said. "While we were disappointed that we weren't working in a structure that was the result of a meteorite hitting the planet three billion years ago, science is about advancing knowledge through discovery, and our understanding of the Earth's [ancient history](#) continues to evolve. Our findings provide [scientific data](#) for resource companies and Greenlandic prospectors to find new mineral resources."

The study, *Stirred not shaken; critical evaluation of a proposed Archean [meteorite](#) impact in West Greenland*, by Yakymchuk and an international team of scientists from Canada, Australia, Denmark, Greenland and the United Kingdom, appears in the journal *Earth and Planetary Science Letters*.

**More information:** Chris Yakymchuk et al. Stirred not shaken; critical evaluation of a proposed Archean meteorite impact in West Greenland, *Earth and Planetary Science Letters* (2021). [DOI: 10.1016/j.epsl.2020.116730](https://doi.org/10.1016/j.epsl.2020.116730)

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