

Meteorite impact caused the highest temperature ever recorded on Earth's surface

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An international team of researchers has found evidence of an ancient meteorite colliding with ground rock on Earth, producing the highest temperature ever recorded on the planet's surface. In their paper published in the journal *Earth and Planetary Science Letters*, the team describes their findings after studying an impact crater in Canada and how they were able to calculate the temperature for an impact that

occurred so many years ago.

Planetary scientists believe that Earth was bombarded on a regular basis during its formative years—by meteorites and other space rocks. Some of those collisions left behind evidence that is still observable today in the form of craters. One of them is Mistastin Lake crater located in Labrador Canada, which is approximately 28 kilometers across, suggesting that the object that struck the Earth there was large. The [researchers](#) dated the collision that caused the crater back to approximately 38 million years ago.

Most craters, the researchers note, do not have much if any evidence of the object that caused them—they vaporize on impact. Likewise, most of the material struck by meteors tends to vaporize, as well. Because of this, it has been difficult to learn more about the nature of the [space rocks](#) and the conditions that occurred when they struck. One thing scientists do know, however, is that when collisions occur, a lot of energy is released in the form of heat—the question is how much. In this new effort, the researchers found a way to measure the heat produced when the object struck the ground in Canada.

In studying the crater, the researchers found [evidence](#) of zircon, a common mineral, being changed into cubic zirconia. Prior work with both minerals has shown that temperatures of 2370° C are required for that to take place. Thus, the heat generated by the impact had to have reached at least that temperature. The finding represents the hottest temperature ever found to exist naturally on the surface of the Earth. The researchers note that this is the first time zirconia has ever been used to calculate the heat of an impact and also shows that some rocks can get hotter naturally than has been thought.

More information: Nicholas E. Timms et al. Cubic zirconia in >2370 °C impact melt records Earth's hottest crust, *Earth and Planetary Science*

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