How an event in what is now the United States may have contributed to the fall of the Roman Empire

With a new analysis of particles found in ice cores, researchers determined that [Alaskan volcano] Okmok's eruption coincided with Rome's cold spell on the other side of the planet [resulting in extensive famine, disease and unrest.]

Fallout from the volcano caused widespread cold weather that lasted for two years, marking some of the coldest temperatures in the region over the past two and a half millennia, finds the study, published [June 22] in the journal Proceedings of the National Academy of Sciences.

To confirm that the source of the fallout in Rome was the Alaska volcano eruption, researchers analyzed frozen volcanic rock, called tephra, which was uncovered in ice cores from the Arctic. They matched up tephra samples from different parts of the world to establish a "chemical fingerprint" that links Rome to Alaska.

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Volcanic fallout releases sulfur particles, which become sulfur dioxide when they react with oxygen. Those particles form sulfuric acid aerosols, which block sunlight from reaching the Earth. As a result, temperatures get cooler — and the effect of big eruptions like Okmok II can spread worldwide.

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The new evidence suggests that the lack of sun and warmth led to devastating outcomes for the Roman republic. Shortly after the eruption, in 27 BCE, Rome became the empire whose ending is still debated today.

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