

Volcanoes wiped Neanderthals out, research suggests

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Astronaut photo of ash cloud from Mount Cleveland, Alaska, USA. Image: NASA

New research suggests that climate change following massive volcanic eruptions drove Neanderthals to extinction and cleared the way for modern humans to thrive in Europe and Asia.

The research, led by Liubov Vitaliena Golovanova and Vladimir Borisovich Doronichev of the ANO Laboratory of Prehistory in St. Petersburg, Russia, is reported in the October issue of [Current Anthropology](#).

“[W]e offer the hypothesis that the Neanderthal demise occurred abruptly (on a geological time-scale) ... after the most powerful volcanic activity in western Eurasia during the period of Neanderthal [evolutionary](#)

[history](#),” the researchers write. “[T]his catastrophe not only drastically destroyed the ecological niches of Neanderthal populations but also caused their mass physical depopulation.”

Evidence for the catastrophe comes from Mezmaiskaya cave in the Caucasus Mountains of southern Russia, a site rich in Neanderthal bones and artifacts. Recent excavations of the cave revealed two distinct layers of [volcanic ash](#) that coincide with large-scale volcanic events that occurred around 40,000 years ago, the researchers say.

Geological layers containing the ashes also hold evidence of an abrupt and potentially devastating [climate change](#). [Sediment samples](#) from the two layers reveal greatly reduced pollen concentrations compared to surrounding layers. That’s an indication of a dramatic shift to a cooler and dryer climate, the researchers say. Further, the second of the two eruptions seems to mark the end of Neanderthal presence at Mezmaiskaya. Numerous Neanderthal bones, [stone tools](#), and the bones of prey animals have been found in the geological layers below the second ash deposit, but none are found above it.

The ash layers correspond chronologically to what is known as the Campanian Ignimbrite super-eruption which occurred around 40,000 years ago in modern day Italy, and a smaller eruption thought to have occurred around the same time in the Caucasus Mountains. The researchers argue that these eruptions caused a “volcanic winter” as ash clouds obscured the sun’s rays, possibly for years. The climatic shift devastated the region’s ecosystems, “possibly resulting in the mass death of hominins and prey animals and the severe alteration of foraging zones.”

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Anthropologists have long puzzled over the disappearance of the

[Neanderthals](#) and the apparently concurrent rise of [modern humans](#). Was there some sort of advantage that helped early modern humans out-compete their doomed cousins? This research suggests that advantage may have been simple geographic location.

“Early moderns initially occupied the more southern parts of western Eurasia and Africa and thus avoided much of the direct impact of the ... eruptions,” the researchers write. And while advances in hunting techniques and social structure clearly aided the survival of modern humans as they moved north, they also “may have further benefited from the Neanderthal population vacuum in Europe, allowing wider colonization and the establishment of strong source populations in northern Eurasia.”

While the researchers stress that more data from other areas in Eurasia are needed to fully test the volcanic hypothesis, they believe the Mezmaiskaya cave offers “important supporting evidence” for the idea of a volcanic extinction.

More information: Liubov Vitaliena Golovanova, et al. “Significance of Ecological Factors in the Middle to Upper Paleolithic Transition.” *Current Anthropology* 51:5 (October 2010).

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