Volcanic eruptions wiped out ocean life 93 million years ago

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University of Alberta scientists contend they have the answer to mass extinction of animals and plants 93 million years ago. The answer, research has uncovered, has been found at the bottom of the sea floor where lava fountains erupted, altering the chemistry of the sea and possibly of the atmosphere.

Undersea volcanic activity triggered a mass extinction of marine life and buried a thick mat of organic matter on the sea floor about 93 million years ago, which became a major source of oil, according to a new study.

"It certainly caused an extinction of several species in the marine environment," said University of Alberta Earth and Atmospheric Science researcher Steven Turgeon. "It wasn't as big as what killed off the dinosaurs, but it was what we call an extreme event in the Earth's history, something that doesn't happen very often."

U of A scientists Turgeon and Robert Creaser say the lava fountains that erupted altered the chemistry of the sea and possibly of the atmosphere.

"Of the big five mass extinctions in the Earth's history, most of them were some kind of impact with the planet's surface," said Turgeon. "This one is completely Earth-bound, it's strictly a natural phenomenon."

Turgeon and Creaser found specific isotope levels of the element osmium, an indicator of volcanism in seawater, in black shale-rocks containing high amounts of organic matter-drilled off the coast of South America and in the mountains of central Italy.

"Because the climate was so warm back than, the oceanic current was very sluggish and it initially buffered this magmatic pulse, but eventually it all went haywire," said Turgeon. "The oxygen was driven from the ocean and all the organic matter accumulated on the bottom of the sea bed, and now we have these nice, big, black shale deposits worldwide, source rocks for the petroleum we have today."

According to their research, the eruptions preceded the mass extinction by a geological blink of the eye. The event occurred within 23 thousand years of the extinction and the underwater volcanic eruption had two consequences: first, nutrients were released, which allowed mass feeding and growth of plants and animals. When these organisms died, their decomposition and fall towards the sea floor caused further oxygen depletion, thereby compounding the effects of the volcanic eruption and release of clouds of carbon dioxide in to the oceans and atmosphere. The result was a global oceanic anoxic event, where the ocean is completely depleted of oxygen. Anoxic events-while extremely rare-occur in periods of very warm climate and a raise in carbon dioxide levels, which means that this research could not only help prove a mass-extinction theory, but also help scientists studying the effects of global warming.

An odd side-effect of the mass extinction, the result of the anoxic event caused as an indirect result of the underwater volcanic eruptions, was that temperatures and carbon dioxide levels on the Earth's surface actually dropped.

"Organic matter that's decaying returns components like carbon and CO2 to the atmosphere," said Turgeon. "But this event locked them up at the bottom of the ocean, turning them into oil, drawing down the CO2 levels of the ocean and the atmosphere."

After 10,000-50,000 years, the carbon dioxide levels rose again. "Business as usual," said Turgeon, adding that this might hold a warning for organic life on the planet today, he said.

"There's a bit of an analogy for what's going on today," he said. "What happens if we pump more CO2 into the atmosphere? This tells me that the oceans maybe have limited buffering capacity for CO2 ."

The research appears on Thursday in the weekly science journal *Nature*.

Source: University of Alberta