

## **Study: Demise of large animals caused by both man and climate change**

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Past waves of extinctions which removed some of the world's largest animals were caused by both people and climate change, according to new research from the University of Cambridge. Their findings were reported today, 05 March, in the journal *Proceedings of the National Academy of Sciences (PNAS)*.

By examining extinctions during the late <u>Quaternary period</u> (from 700,000 year ago until present day), but primarily focusing on the last 100,000 years, scientists have been able to assess the relative importance of different factors in causing the extinctions of many of the world's terrestrial megafauna, animals 44 kg or larger. These extinctions included mammoths in North America and Eurasia as well as <u>mastodons</u> and giant sloths in the Americas, the woolly rhino in Europe, giant kangaroos and wombats in Australia, and the moas (giant <u>flightless birds</u>) in New Zealand.

The researchers used data from an Antarctic ice core, which gives one of the longest running records of changes in the earth's climate, covering the last several hundred thousand years. They also compiled information on the arrival of modern humans from Africa on five different landmasses (North America, South America, most of Eurasia, Australia and New Zealand).

By conducting a statistical analysis using both the climatic information and the timing of arrival of modern humans, they were able to determine whether the pattern of extinctions across landmasses was best explained



by <u>climate change</u>, the arrival of <u>modern humans</u>, or both. They concluded that it was a combination of both the arrival of man (probably through hunting or habitat alteration) as well as climate change which caused the extinctions.

The authors believe that the research provides insights into the consequences of pressures on megafauna living today, including tigers, <u>polar bears</u>, elephants and rhinos.

Graham Prescott, currently a PhD student at the University of Cambridge and co-author on the paper, highlighted how their research may inform us about the current plight facing large animals: "Our research suggests that a combination of human pressure and climate change was able to cause the extinctions of many large animals in the past. Many large, charismatic animals today are threatened by both hunting pressure and changes in climate; if we do not take action to address these issues we may see further extinctions. And in contrast to the people who first encountered these megafauna, people today are fully aware of the consequences of our actions; this gives us hope that we can prevent future extinctions, but will make it all the worse if we do not."

David Williams, currently a PhD student at the University of Cambridge and co-author on the paper, added: "The loss of these animals has been a zoological puzzle since the time of Charles Darwin and Alfred Russel Wallace. At that time, many people didn't believe that human-caused extinctions were possible, but Wallace argued otherwise. We have now shown, 100 years later, that he was right, and that humans, combined with climate change have been affecting other species for tens of thousands of years and continue to do so. Hopefully, now though, we are in a position to do something about it."

Professor Rhys Green, an author on the paper from the University of



Cambridge and the Royal Society for the Protection of Birds (RSPB) said: "Most previous studies have argued that the <u>extinction</u> of mammoths and other megafauna is linked separately to either human pressure or climatic change. Our work indicates that they had their devastating effect working together. This previous combination of unusual patterns of climate change and direct human pressure from hunting and habitat destruction is similar to those to which we are subjecting nature to today and what happened before should be taken as a warning. The key difference this time is that the climate change is not caused by fluctuations in the earth's rotation axis but to warming caused by fossil fuel burning and deforestation by humans - a double whammy of our own making. We should learn the lesson and act urgently to moderate both types of impact."

**More information:** Quantitative global analysis of the role of climate and people in explaining late Quaternary megafaunal extinctions, March 5, 2012 edition of *PNAS*.

Provided by University of Cambridge

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