

Mammal body-size responds to climate change in ancient Wyoming

October 22 2015

Evidence from fossils suggests that multiple global warming events, which occurred over 50 million years ago, impacted the evolution of mammals living in ancient Wyoming. Using over seven thousand fossilized teeth, paleontologist Amy Chew found a reduction in body size of mammal populations, hypothesized to be related to warming events. This work, to be presented at the upcoming Society of Vertebrate Paleontology conference in Dallas, Texas, provides a unique glimpse at the long-term impact of climatic change on mammal populations.

To unravel the link between past climates and animal faunas requires an exceptional fossil [record](#). Chew, an associate professor at Western University of Health Sciences, California, used fossils from the Bighorn Basin of Wyoming, a nearly complete record of around 5 million years of mammalian evolution, to study responses of mammal communities through time. "The Bighorn Basin fossil record, particularly from this part of the basin, is one of the best early Cenozoic terrestrial records in the world." remarks Chew. "My colleagues have been assembling the fossil samples on which this work is based for more than 30 years. Their efforts have produced a superb, highly resolved, thoroughly studied record that is unparalleled. This record allows us to examine more sophisticated questions about faunal response to climate and environmental change than was previously possible."

Information on past climate in the Bighorn basin comes from the structure of carbon atoms, known as isotopes, preserved in the rock. This technique revealed three global warming events. The first occurred 55

million years ago, and has been previously linked to decreasing body-size. However, data from the next two events, occurring two million years later, is required to test if this forms part of a larger evolutionary pattern. "No other terrestrial record exists with the density of fossils necessary to test faunal response to the later hyperthermals [climatic warming]. The central Bighorn Basin record essentially documents a set of repeated, natural experiments in climate warming." Chew explains.

Chew examined the size of over 7500 fossil teeth from over one hundred types of mammals, and compared them before, during and after the climatic warming events. On average, the Bighorn Basin teeth were 10-20% smaller during the warm periods. Some lineages of mammals became smaller themselves, in a process known as dwarfing. However, mostly size change was driven by an increase in the abundance of small species relative to large ones in the basin during warm periods.

These findings add to the increasing evidence for the strong link between climatic change and animal populations. "The ability to compare faunal response between events is critical for establishing mechanisms of change and predicting the consequences of future warming."

More information: A. E. Chew. Mammal faunal response to the Paleogene hyperthermals ETM2 and H2, *Climate of the Past Discussions* (2015). [DOI: 10.5194/cpd-11-1371-2015](https://doi.org/10.5194/cpd-11-1371-2015)

Provided by Society of Vertebrate Paleontology

Citation: Mammal body-size responds to climate change in ancient Wyoming (2015, October 22) retrieved 4 July 2024 from <https://phys.org/news/2015-10-mammal-body-size-climate-ancient-wyoming.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.