

Media Contact:

Ben Norman

lifesciencenews@wiley.com

+44(0) 1243 770 375

New Study Reveals Link Between ‘Climate Footprints’ and Mass Mammal Extinction

New global approach reveals changing climate contributed to pre-historic mammal extinction

An international team of scientists have discovered that climate change played a major role in causing mass extinction of mammals in the late quaternary era, 50,000 years ago. The study, published in *Evolution*, takes a new approach to this hotly debated topic by using global data modelling to build continental ‘climate footprints.’

“Between 50,000 and 3,000 years before present (BP) 65% of mammal species weighing over 44kg went extinct, together with a lower proportion of small mammals,” said lead author Dr David Nogues-Bravo working currently at the Center for Macroecology, Evolution and Climate in University of Copenhagen. “Why these species became extinct in such large numbers has been hotly debated for over a century.”

During the last 50,000 years the global climate became colder and drier, reaching full glacial conditions 21,000 years before present time. Since then the climate has become warmer, and this changing climate created new opportunities for colonization of new regions by humans. While both of these global change actors played significant roles in species extinction this study reveals that changing climate was a significant force driving this mass extinction.

“Until now global evidence to support the climate change argument has been lacking, a large part of existing evidence was based on local or regional estimates between numbers of extinctions, dates of human arrivals and dates of climate change,” said Dr Nogues-Bravo. “Our approach is completely different. By dealing with the issue at a global scale we add a new dimension to the debate by showing that the impact of climate change was not equal across all regions, and we quantify this to reveal each continent’s “footprint of climate change.”

The study shows that climate change had a global influence over extinctions throughout the late quaternary, but the level of extinction seems to be related to each continent’s footprint of climate change. When comparing continents it can then be seen that in Africa, where the climate changed to a relatively lesser extent there were fewer extinctions. However, in North America, more species suffered extinction, as reflected by a greater degree of climate change.

A key piece of evidence in the humans versus climate debate is the size of the extinct mammals. It has always been assumed that humans mainly impacted on populations of large mammals, while if climate change played the key role there should be evidence of large impacts on small mammals as well as the larger animals.

The team's results show that continents which suffered larger climate change impacts suffered larger extinctions of small mammals and *viceversa*, further strengthening the idea that climate change was a key factor in controlling past extinctions on a global scale.

This research has important implications for the current study of climate change, not only in revealing the role of the climate in causing extinction in mammals, but also by demonstrating how the effect will be different across regions and continents.

“Our results show that continents with the highest ‘climate footprints’ witnessed more extinctions than continents with lower ‘climate footprints’. These results are consistent across species with different body masses, reinforcing the view that past climate changes contributed to global extinctions.”

“While climate change is not the only factor behind extinction, past, present or future, we cannot neglect in any way that climate change, directly or indirectly, is a crucial actor to understand past and future species extinctions.”, said Miguel Araujo, a co-author of the paper from the National Museum of Natural Sciences in Spain.

This study is published in *Evolution*. To request a copy of this paper contact Ben Norman at Lifesciencenews@wiley.com or +44 (0) 1243 770 375

Full Citation

Nogues-Bravo, D. Ohlemuller, R. , Batra, P. , Araujo, M.B., “*Climate predictors of Late Quaternary extinctions*,” *Evolution*, Wiley-Blackwell, May 2010. DOI:

About the Author

The lead author for this paper is Dr David Nogues-Bravo, from the Center for Macroecology, Evolution and Climate at the University of Copenhagen .Dr Nogues-Bravo's research included clarifying the causes behind Late Quaternary Extinctions, Improving Species Distribution Models and studying Patterns of species richness. His recent paper on ‘Climate change, humans and the extinction of the woolly mammoth’ was highlighted at: Nature Climate Change Reports, New Scientist, Scientific American, National Geographic News, CNN Plus, El País, Telegraph, Fox News, ABC News, Le Monde, DerStandard, SpektrumDirect.

About the Team

Dr Ralf Ohlemuller is a RCUK Fellow, based in the School of Biological and Biomedical Sciences at the University of Durham. Currently Dr Ohlemuller is developing a research program on assessing risk to biological systems from climate change using the species, functional and genetic make-up of selected key ecosystem and regions.

Dr Persaram Batra is a visiting Assistant Professor at the Department of Earth and Environmental Sciences at Mount Holyoke College in Massachusetts. Professor Batra's specialist research areas include Climate modeling, paleoclimate, climate and history

Dr Miguel Araujo is based at the Museo Nacional Ciencias Naturales where he is the the Leader of the Biodiversity and Global Change (BIOCHANGE) Lab. Dr Miguel Araujo also the Deputy Editor of Ecography and the Associate Editor of the Journal of Biogeography, Conservation Letters, and Geography Compass.

To request an interview with any of these authors, please contact Lifesciencenews@wiley.com



About The Journal

Evolution is the international journal of organic evolution, it is published for the Society for the Study of Evolution and it is the premier publication devoted to the study of organic evolution and the integration of the various fields of science concerned with evolution. The journal presents significant and original results that extend our understanding of evolutionary phenomena and processes.



About Wiley-Blackwell

Wiley-Blackwell is the international scientific, technical, medical and scholarly publishing business of John Wiley & Sons, with strengths in every major academic and professional field and partnerships with many of the world's leading societies. Wiley-Blackwell publishes over 1,400 peer-reviewed journals as well as 1,500+ new books annually in print and online, as well as databases, major reference works and laboratory protocols. For more information, please visit www.wileyblackwell.com or www.interscience.wiley.com.