2019

Changes in North American mammal niche preferences from the late Pleistocene to the present

Silvia Pineda-Munoz

Anikó Tóth

S. Kathleen Lyons

Yue Wang

Jenny McGuire

INTERNATIONAL
BIOGEOGRAPHY
SOCIETY

PROGRAM GUIDE &

ABSTRACTS

9th Biennial Conference
of
The International Biogeography Society

MÁLAGA, SPAIN
January 8-12, 2019

CS10-08

Changes in North American mammal niche preferences from the late Pleistocene to the present

Silvia Pineda-Munoz[1], Anikó Tóth[2], S. Kathleen Lyons[3], Yue Wang[4], Jenny McGuire[1]

[1]Georgia Institute of Technology, Atlanta, GA, United States
[2]Macquarie University, Sydney, Australia
[3]Unviversity of Nebraska - Lincoln, Lincoln, NE, United States
[4]Georgia Institute of Technology, Atlanta, Wisconsin, United States

Human population has exponentially grown since the last glaciation, especially across temperate areas with easy access to water sources, excluding mammal species from their former habitats. Thus, we anticipate a change in environmental niche preferences for temperature and precipitation as increased human population forces mammal species into more extreme climates within their environmental tolerances. For our study, we collected species occurrences from 20,000 ybp to the present for 59 North American mammal species. We inferred temperature and precipitation for each location using paleoclimate simulations (CCSM3). Overall, we found that mammals now live in areas that are warmer and dryer on average, as mean annual temperatures rise and precipitation decreases. Their niches have significantly changed in the last 20,000 years for most climate variables except for maximum average monthly temperature and minimum average monthly precipitation, which still maintain a hard limit on geographic boundaries. Our results suggest that although they avoid some climate extremes, including hot temperatures and dry climates, most mammals in our dataset adapt to new climate conditions instead of moving to new geographic areas. This could be related to a high niche plasticity for climate or to geographic and anthropogenic dispersal limitations that prevent animals from migrating to new localities as human population increases and climate changes. Geographic models that integrate fossil and modern niche preferences and dispersal limitations will help elucidate the reasons behind the observed patterns. Moreover, understanding these patterns will help us formulate better conservation plans for the species we wish to protect.