166-15 - PALEOCLIMATIC RECONSTRUCTION OF THE LATE PLEISTOCENE COASTAL NEOTROPICS USING FOSSIL SMALL VERTEBRATES FROM TALARA, PERU

Tuesday, 17 October 2023

8:00 AM - 5:30 PM

Hall B (2, David L Lawrence Convention Center)

Booth No. 85

Abstract

Functional traits of fossil vertebrates can be used to infer paleoenvironmental conditions at Quaternary sites, allowing research into past climate changes and biotic responses. Birds are commonly used in such analyses, but they are generally considered poor palaeoclimatic proxies because of their high vagility. Here, we analyze biogeographical and climatic niche information from multiple vertebrate groups including small mammals, reptiles, and birds to infer the paleoclimatic conditions present during the Late Pleistocene at Talara, an asphaltic ("tar pir") paleontological locality on the northern Peruvian coast preliminary dated to ~14,500 – 17,000 years BP. We created Ecological Niche Models for the nearest living relative of each fossil species identified at Talara. We use the Mutual Ecogeographic Range method, obtaining the overlapping area between the distribution for each vertebrate group (birds, reptiles, small mammals) as well as for combinations of groups (reptiles + small mammals and reptiles + birds + small mammals). Our analyses indicate that conditions at Talara were colder and wetter than those of the present day. Individually, different vertebrate groups provide different paleoclimatic information. Birds and mammals are good groups for inferring paleoprecipitation but not paleotemperature. Reptiles are a good group for inferring paleotemperature but not paleoprecipitation. While analyzing all vertebrate groups together yields the most robust conclusions, reptiles and small mammals combined are a good proxy for inferring both paleoprecipitation and paleotemperature. Our results suggest an interstadial period that agrees with paleotemperatures inferred from isotopic and sedimentary information. Our research indicates that today, biogeographical provinces such as Venezuelan, Caatinga, extreme north of Puna, and Western Ecuador have comparable climatic conditions to Late Pleistocene Talara. Understanding how the Talara region transitioned from this biodiverse ecosystem to the hyperarid coastal desert of today could have important implications for predicting biotic response and tipping points in the context of modern climate change.

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