PP51B-1080 Trends of Pacific Northwest (USA) terrestrial paleoclimates across the Miocene using Digital Leaf Physiognomy analysis of fossil leaves

Friday, 15 December 2023
11:30 - 15:50
Poster Hall A-C - South (Exhibition Level, South, MC)

Abstract

Analyzing the leaf morphology (leaf physiognomy) of paleofloras can provide crucial data for reconstructing terrestrial paleoclimates across periods of major climatic change, such as those occurring in the Miocene epoch. The Miocene Climatic Optimum (MCO; ~17-14 Ma) was Earth's most recent major warming event and the Middle Miocene Climatic Transition (MMCT; 14-12 Ma) was associated with decreased global temperature and precipitation leading to the establishment of many modern ecosystems. Previous paleoclimate reconstructions from the terrestrial realm show variability in regional responses to Miocene global climatic changes, highlighting the importance of regional specific records. The Pacific Northwest (USA) contains a continuous fossil plant record during the Miocene due to coeval volcanic eruptions, providing rapidly filling lake basins that preserved paleofloras, and depositing volcanic ash useful for establishing U-Pb geochronological constraints. These conditions make this region an ideal candidate for improving the resolution of terrestrial climate reconstructions across the MCO and MMCT. Most prior leaf physiognomy-based paleoclimate reconstructions across the Miocene of the Pacific Northwest used unpublished floras, poor geochronological constraints, and methods relying on categorical descriptors of leaf physiognomy. In this study, we reconstruct paleoclimate using Digital Leaf Physiognomy (DiLP), a technique employing continuous measures of leaf physiognomy that share strong relationships with climate, on several Pacific Northwest paleofloras spanning the MCO and MMCT within a refined U-Pb geochronological framework. Improving the resolution of

climate reconstructions for the MCO and MMCT can provide crucial information to understanding potential responses of terrestrial climate to ongoing anthropogenic climate change, and more detail on the establishment of modern ecosystems.

First Author

N

Francisco Nares
University of Florida

Authors

L

Alexander Lowe
University of Washington

S

Mark David Schmitz
Boise State University

D

Richard Dillhoff
Burke Museum

D

Thomas Dillhoff
Burke Museum

R

William Rember
University of Idaho

S

Caroline A E Strömberg
University of Washington

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