



Late glacial to modern changes in the latitudinal functional diversity gradient in North America

Thomas Brussel and Simon Brewer

University of Utah, Geography, United States (thomas.brussel@geog.utah.edu)

The latitudinal biodiversity gradient (LGB) is the fundamental, global pattern of species distributions and is described as the phenomenon of declining net biodiversity with increasing absolute latitude. Although the LGB is hypothesized to be a universal biogeographical diversity pattern, there has yet to be a consensus reached on the causal mechanisms driving the gradient. Additionally, modern patterns are dependent on previous environmental conditions that established over geologic time, but an understanding of how these patterns developed in relation to climatic configurations over long-time scales is largely uncertain. Within the global configuration, however, is an apparent macro-scale pattern of functional biodiversity.

Here, we assess how the latitudinal functional diversity gradient changed in North America over the past 15,000 years. Functional traits are linked to pollen records and Hutchinsonian hypervolumes are used to quantify estimations of functional trait space at alpha, beta and gamma diversity scales. Results indicate the dynamics of this diversity pattern, in that the gradient strengthened over the time-scales of the analysis. We also compared trends in diversity to paleoclimate drivers of vegetation change, and significant changes in the gradient correspond with climatic and anthropogenic changes. These outcomes provide a basis for understanding how the LGB may change in the future.