

Cosmopolitan and endemism dynamics of terrestrial Cenozoic mammals

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Abstract

Community structure plays a fundamental roll in determining ecological dynamics. Evolutionary paleoecology is concerned with how ecological traits expressed at any level affect the evolutionary process. Related to this is how ecological traits are related to the distribution of biota across space, which in turn affects the structure and nature of biotic interactions. Here, I investigate whether community structure has or has not changed in relation to life history traits over geologic time and as abiotic conditions have changed. Life history traits are those traits which are expressed at the organismal level but are constant across all members of that species. evolutionary paleoecology
life history traits
taxonomic distribution
what is driving similarity in biotic interaction?

Introduction

Evolutionary paleoecology is defined as the study of the consequences of ecological properties, roles and strategies at any and all levels on the evolutionary process Kitchell [5]. How taxonomic composition of communities have changed over time is of interest because Previous work on mammalian site similarity has focused on organismal dietary distributions of terrestrial mammals in the Neogene Old World [3, 4]. Here, I expand that analysis the entire Cenozoic of North America and analyze both diety and locomotor categories of terrestrial mammals.

Methods

Mammalian taxonomic occurence information was obtained from the Paleobiology Database (<http://www.paleodb.org>). Taxonomic occurence information was restricted to only mammals occuring in North America during the Cenozoic. Ambiguously identified taxa were excluded from all analyses (e.g. aff., cf., ?). Temporal, geologic, dietary and life habit informaiton was also compiled for all taxa. Because terrestrial assemblages across the Cenozoic do not preserve as complete a record of community structure, taxonomic abundance distributions were not analyzed. Following Sidor et al. [6] and Vilhena et al. [7], bipartite taxa-locality networks were constructed. Here, taxa were defined as the occurrence list of all unique species and locality was defined as formation. Biogeographic networks were constructed at two different temporal scales: geologic stages of the Cenozoic and uniform 2 My bins from the K/Pg to the Recent. Uniform 2 My bins were chosen for multiple reasons. Prior analysis has shown that the mammalian fossil record of the Cenozoic of North America is resolvable to approximately 1 My Alroy [1], Alroy et al. [2]. Here, because I am interested in diversity dynamics across multiple formations, I increased bin width to 2 My to allow for every bin to be represented by minimum two formations. Presented here are the results from analysis of the uniform 2 My bins.

Relative abundance

Results

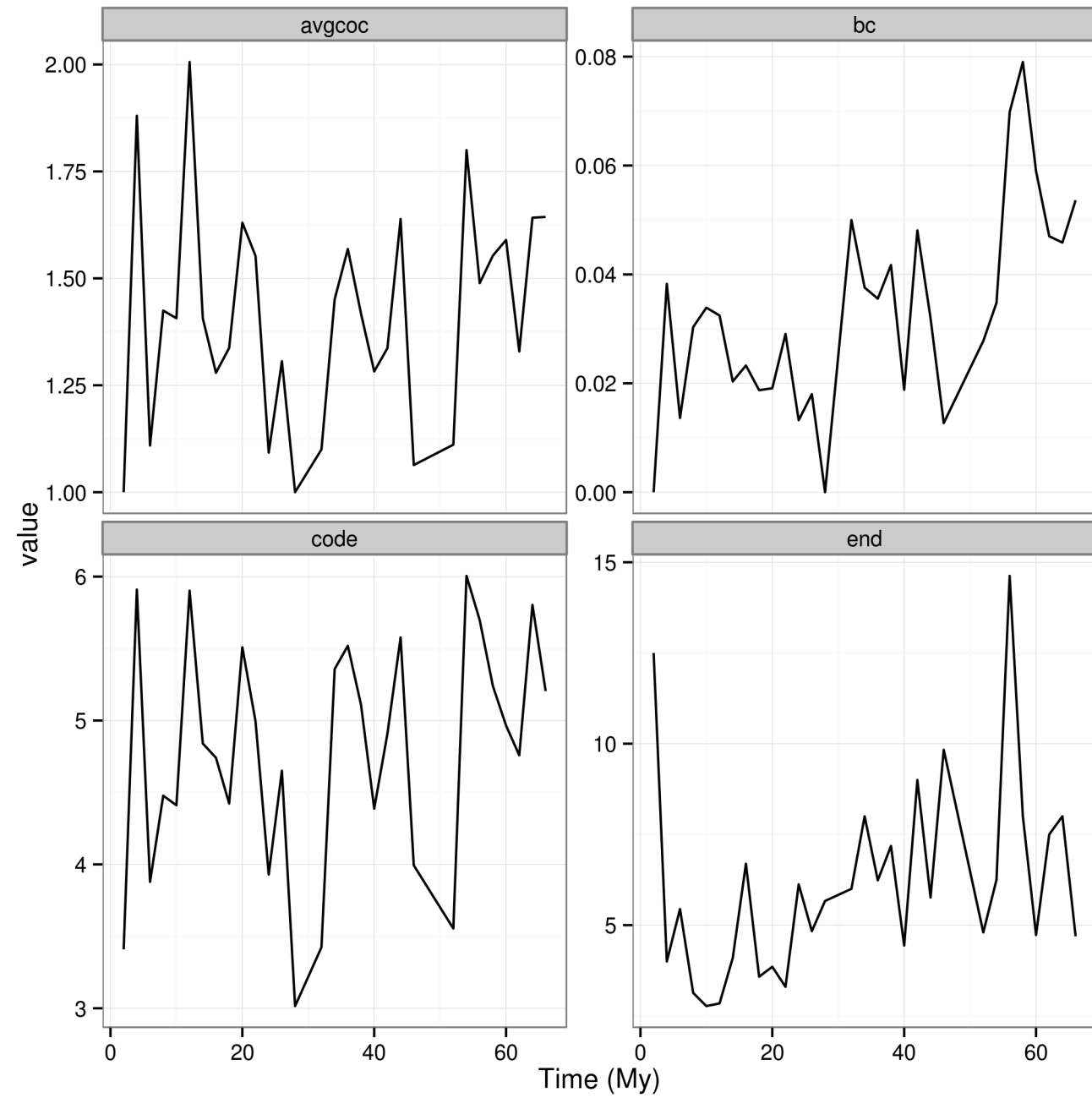


Figure: Summary statistics of the mammal wide biogeographic networks for every 2 My bin.

Fancy

Biogeographic networks

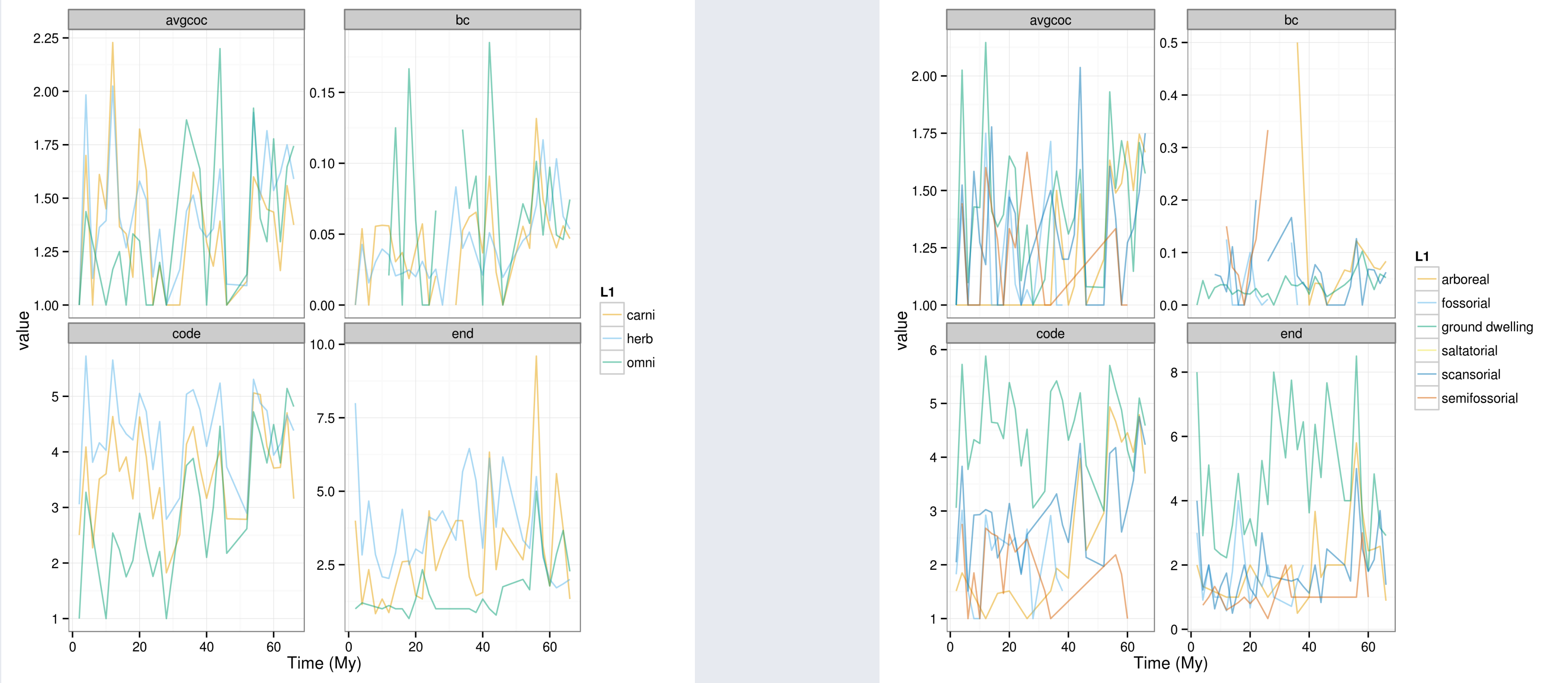


Figure: Biogeographic network summary statistics from the 2 My bins.

Discussion

Conclusions

Acknowledgements

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