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Tectonic drivers of the scaling dinosaurian fossil record

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The fossil record is the only direct source of information of the evolution, ecology, and biogeography of non-avian dinosaurs. The taphonomy is the science of the study of transition of biological information in to the stratigraphical record. The stratigraphical record is characterized by multiscale spatial and temporal structure. The largest scale structures are often called “megabiases”. Here we study the structure of megabiases of the dinosaurian fossil record from the Paleobiology Database in time as well as in space. We found a strong tendency of dinosaur occurrences to cluster at tectonic plate boundaries. Moreover, there are systemic temporal differences in the degree of this outward distribution of occurrences which are related to the sea level and the degree of tectonic fragmentation. Finally, we used spatial distributional patterns in simulating occurrences, and determined the effects of such inhomogeneities on the accuracy of determination of bioprovinces using newly developed R package ‘HespDiv’ for contiguous spatial cluster analysis.

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