
Tectonic reshaping of the biosphere

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Résumé

Changes of physical environment, whether geological or climatic, is a major driver of biodiversity. However, the role of landscape complexity on biodiversity mechanisms remains incompletely understood. To test whether variation of physiography through time and space can explain the current richness pattern of biodiversity and understand the impact of landscape complexity evolution onto ecological rules, we simulated the diversification of terrestrial vertebrate taxa at global scale, over 150 Ma of geological and climatic changes, using a spatially explicit eco-evolutionary simulation model. We designed four scenarios in which landscape complexity was implemented in distinct ecological rules, with a null model (M0) dependent only on climatic factors, a model with speciation based on landscape complexity (M1), another scenario with species dispersal dependent on landscape complexity (M2) and finally a model with niche ecology dependent on abiotic factors with both climate and physiography (M3). Extracted phylogenies, species distributions and speciation events from the simulations will be thereafter compared to biological empirical data to better understand biotic and abiotic interactions.

Mots-Clés: physiography, mechanistic modeling, biodiversity

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