Geophysical Research Abstracts
Vol. 20, EGU2018-14590, 2018
EGU General Assembly 2018

Quantitative methods to infer diversification, dispersal and extinction

Daniele Silvestro (1,2,3)

(1) University of Gothenburg, Biological and Environmental Sciences, Sweden (daniele.silvestro@bioenv.gu.se), (2) Global Gothenburg Biodiversity Centre, Sweden, (3) Department of Computational Biology, University of Lausanne, Lausanne, Switzerland

The increasing availability of digitized paleobiological data provides us with the opportunity to develop more complex models of evolution and preservation and to analyze the fossil record in new ways. Here I present a Bayesian framework to infer macroevolutionary dynamics from fossil occurrence data. I will focus on methods to estimate taxonomic diversification (origination and extinction rates) and historical biogeography (dispersal rates) with empirical examples from different groups of organisms. These analyses highlight the remarkable potential of paleobiological data to improve our understanding of how species originate, migrate, and go extinct through time and in space. One of the advantages of a unified probabilistic framework to analyze fossil data is that it provides the tools to compare competing hypotheses about the tempo and mode of evolutionary processes and their driving mechanisms. For instance, statistical model testing enables us to quantify the relative importance of climate change and biotic factors in determining past biodiversity changes. Finally, I will discuss how the analysis of fossil occurrences can be complemented with different types of data (e.g. geological record and phylogenies of extant taxa) to obtain a more complete picture of diversification and migration processes.