

Variability issues in compositional regression models to understand the marine community dynamic of Abrolhos in Brazil. A hierarchical approach using Bayesian inference.

In compositional regression it is important to detect which part of a whole presents high variability to help to understand some patterns about the complete process. This work proposes a procedure to characterize this peculiarity without giving up the data's natural restriction. A probabilistic Dirichlet regression model combining the usual compositional model with hierarchical structure was developed. The inference procedure was done under the Bayesian approach using the Hamiltonian Monte Carlo (HMC) method to obtain approximations to the posterior marginal distributions of interest. To avoid model identifiability issues, decision theory provides support in choosing one component as a reference. This model was motivated by the two ecological compositions in the Abrolhos Reefs of Brazil. The main results allow us to recognize patterns such as skewness, heteroscedasticity and atypical observations related to one specific component. Additionally, measuring the local effects on these compositions contribute to characterizing this marine community life.