Zooplankton biodiversity in response to environmental change

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Abstract: The aim of this work is to explore structural and functional modifications of zooplankton communities in response to environmental change, including eutrophication and acidification. In order to do so, we need to model reference conditions and trends for zooplankton based indicators under different scenarios. The data set will be zooplankton species abundance data from several hundred lakes. To obtain a data set for a lake that is as representative as possible for the community composition a given year, we reduce the effect of sampling and seasonal variation by collecting two samples from the littoral and one from the pelagic zone at least twice each season. The similarity in community composition between samples was evaluated by fitting a bivariate Poisson-lognormal species abundance model. The estimated correlation in this bivariate distribution is used as a measure of similarity since this approach is utilizing all the available abundance information and accounts for the sampling process. Application of the bivariate correlation as a similarity measure offers advantages over traditional measures because it takes account of the complete species abundance distributions. This approach provides an approximately unbiased estimate of similarity despite varying sample sizes and detection/ non-detection of species that are present, but rare. The temporal or spatial change in community structure, quantified by the bivariate correlation, can now be modeled by some environmental covariates.