

Assessing changes in biodiversity over space and time

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Keywords: abundance; measures of biodiversity; spatial ecology; species distribution models.

Abstract: Partitioning biodiversity change both spatially and temporally is required for effective management at regional and local scales. As biodiversity is a multifaceted concept, comparative analyses of different indices, focussing on different components of biodiversity change (evenness versus abundance), give better information than a single headline index. We model changes in the spatial and temporal distribution of British breeding birds using species-specific generalized additive models (GAMs) applied to count data collected between 1994 and 2011. Combining the results across species we assess temporal trends in biodiversity, and change points in those trends, at different spatial scales. The geometric mean of relative abundance, a headline indicator of biodiversity change, is assessed together with a goodness-of-fit evenness measure focussing separately on the rare and common species. As a complement to the biodiversity indices we also assess temporal turnover in species composition and how that varies spatially based on the results from the above GAMs. Modelling spatio-temporal changes in biodiversity and attributing those changes to potential drivers, such as climate, is a difficult problem. The ‘standard’ approach for including climate information into spatio-temporal models of this kind – including each weather variable as a linear covariate with a single regression coefficient – confounds the spatial and temporal effects of the covariates. I will end the talk with an example of hierarchical centring methods that enable one to disentangle the spatial and temporal effects of such covariates.