

Classification of biodiversity indicators based on context-dependent dynamics: A case study of a coastal fish community

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Abstract

Species richness, evenness, and taxonomic diversity have been proposed and used as indicators of biodiversity. However, the governing equations for the dynamics of these indicators are often unknown and an understanding of their mechanism is limited. By employing a nonlinear forecasting-based method to the time series of 10 biodiversity indicators of a marine fish community, we aimed to detect changes in their dynamics and classify the indicators according to the level and timing of dynamic changes. The 10 biodiversity indicators were classified into three super-groups: Group I (species richness and community center of distribution) with the most unchanged dynamics; Group II (species diversity and total abundance) with dynamics that had an abrupt change in the middle, presumably due to an increase in local temperature; and Group III (species evenness) with highly variable dynamics. Finally, a hypothesis regarding the mechanistic basis of the dynamic similarities between the biodiversity indicators was proposed.

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