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Quantifying coastal biodiversity change across continental scales: a case-study comparison of European and South African shores

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Abstract

Multiple scales of anthropogenic effects have been observed along modern coastlines and these have been linked to patterns of recent biodiversity change. However, the metrics used to monitor this change are not always fully representative of functional compositional shifts in communities. For example, standard measures such as diversity or richness can theoretically remain unchanged between two time intervals even if the community composition altered substantially. In this study we compared long-term monitored examples (≥ 5 years) of coastal biodiversity data between two disparate marine regions: the North Sea (Germany) and the South African coast. We applied a new method of assessing biodiversity change which specifically accounts for compositional turnover rates (Hillebrand et al. 2017 *Journal of Applied Ecology*). Results suggested that there was little change in univariate measures of diversity and richness for both regions. In contrast, the turnover metrics showed that the communities were reworked on average to a 30% compositional change. Geographical similarities in terms of accumulation rates of turnover over time were also apparent. This suggests that community turnover metrics are a better representation of biodiversity change than conventional indices, and that this reasoning can be applied across broad spatial scales. A secondary outcome of this study highlighted the need and value of long-term coastal biodiversity monitoring data to accurately quantify change. This research will appear in *Philosophical Transactions of the Royal Society B: Biological Sciences*.

Keywords

species turnover, termporal trends, long-term monitoring, coastal biodiversity