Regional databases demonstrate macroecological patterns less clearly than systematically collected field data

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Abstract

The analysis of macroecological patterns has necessitated the use of large, composite datasets recording local-scale species occurrences distributed across the globe. These datasets, however, have various spatial and temporal biases. They have rarely been compared to data collected in the field across large spatial gradients. In this paper we use two datasets built from online repositories plus a standardised field collection to reconstruct macroecological patterns for marine bivalves along the eastern coastline of Australia – spanning over 20° of latitude. We test the strength of the latitudinal diversity gradient using four diversity measures and identify a biogeographical boundary. The field collection demonstrates a strong latitudinal gradient, but mixed support was found in the composite datasets. Worse, adding observation-based records to the composite dataset obscured the latitudinal gradient. The biogeographic boundary was consistently found, and the location mirrored two previously published bioregionalisations. Although broad patterns seen in the field can be uncovered from composite macroecological datasets, care both in dataset construction and choice of methods is needed to ensure robust results.

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