
Connectivity within an oceanic seamount system: comparative phylogeography of widely-distributed benthic invertebrates from the Indo-West Pacific

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Abstract

Analogous to oceanic islands, seamounts, which constitute one of the largest marine biomes on earth, offer a set of fragmented habitats in which benthic species with poor dispersive ability may undergo divergence in allopatry. This scenario have led many studies to interpret the originality of seamount-associated fauna as endemism resulting from the genetic isolation forced by the habitat fragmentation. However, the biogeography of seamount fauna remains poorly known, as less than 1% of the world’s seamounts have been investigated. Moreover, many marine organisms have one or more highly dispersive phases in their life cycle (e.g. gametes, larvae and/or adults), which should hinder allopatric divergence among distant seamount populations. Based on samples from 16 deep-sea cruises carried out by the *Tropical Deep-Sea Benthos* research program across the Indo-West Pacific, we investigate the intra- and interspecific genetic divergence in 170 octocorals of the genus *Chrysogorgia* and 150 galatheids of the genus *Agononida*. These two taxonomic groups are characteristic of seamounts benthic fauna and share a common distribution range that encompasses two biogeographic barriers: the Indo-Malay archipelago separating the Indian and the Pacific oceans and the vast open ocean separating the Western and the Central Pacific. Using RAD-seq and based on four lanes of Illumina sequencing, we first use coalescent-based approaches to species delimitation using genome-wide SNP data and compare outputs with the primary species-hypotheses based on standard mitochondrial barcodes. Within delineated species, we then examine the connectivity patterns among seamounts and across the biogeographical barriers. Overall, our study enable the coupling of robust biodiversity assessment with investigations into species distribution and divergence processes in the deep-sea, which is of great interest with regard to the appraisal of seamount biodiversity, conservation efforts and global taxonomic initiatives.

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