Across-axis transition of deep-sea hydrothermal vent fauna in southern Mariana Trough

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Dispersal is an important event to sustain metapopulations in ephemeral and patchily distributed environments such as deep-sea hydrothermal vent fields. Most hydrothermal vent fields are distributed along spreading axes, and across-axis dispersal of vent fauna is little known. In the present study, phase transition of hydrothermal benthic communities was observed and dispersal inferred among three hydrothermal vent fields, the on-axis Snail site, the off-axis Pika and Urashima sites and the Archaean site in between, across axis in the Southern Mariana Trough. Size frequencies of Austinograea williamsi, Chorocaris vandoverae and Alviniconcha hessleri showed that populations in the Snail site were the largest among three sites. However, genetic diversities of local populations of Al. hessleri, C. vandoverae and Neoverruca brachylepadoformis were the highest in the Pika and Urashima sites, although no significant genetic subdivision was detected among the populations in all the examined species. Tidal analysis of a current meter deployed near Snail site supports the possibility for panktonic larval dispersal from on- to off-axis. These results suggested the possibility for across-axis larval dispersal which promotes on- to off-axis transition of benthic fauna in hydrothermal vent fields.

Keywords: Backarc basin, Biodiversity, Genetic diversity, Planktonic larval dispersal