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TITLE: Characterization of vent fauna at three hydrothermal vent fields on the Southwest Indian Ridge: Implications for biogeography and interannual dynamics on ultraslow-spreading ridges

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ABSTRACT:

The Southwest Indian Ridge (SWIR) is an important section of the global mid-ocean ridge system providing a corridor for dispersion of vent fauna between the Pacific and Atlantic Oceans. However, very few studies focusing on the biodiversity and biogeography of this region have been performed. To better understand the biological baseline and biogeography of vent fields on SWIR, we have described the faunal assemblages at three hydrothermal fields on SWIR, the biogeographical relationships among the three fields and fields on neighboring ridges as well as community dynamics at Longqi on a short time-scale (3 years). Communities at two fields, Duanqiao and Tiancheng, were reported for the first time, and the Longqi community was characterized more comprehensively. Collected specimens, videos and images were examined and taxa identification was conducted by both morphological and molecular approaches (cytochrome oxidase I (COI) or 16 S ribosomal RNA gene). In total, 39 species were recorded, 18 of which were reported from SWIR for the first time. According to the multivariate analysis of occurrence of fauna from 16 vent fields on four ridge systems, the SWIR vent sites were generally more similar to Central Indian Ridge. Within Indian Ocean, Longqi and Duanqiao formed a subcluster, which appeared to be intermediate between the Central Indian Ridge, Mid-Atlantic Ridge and East Scotia Ridge. Distinct faunal zonation was described at Tiancheng and Longqi. Comparison of vent fauna discovered in 2011 and 2014/2015 revealed an interannual constancy in faunal zonation on most vents at Longqi, except DFF1 chimney, which displayed a successional change from an early stage featuring high-temperature venting and low species diversity, to a more mature stage characterized by diffuse fluid and more colonized taxa. Thus, the present study is the first interannual variation study on the ultra-slow spreading ridges, and will expand our understanding of biodiversity and biogeography of vent fields on SWIR.

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