

Diversity and biogeography of vent fauna at hydrothermal vents from Southwest Indian Ocean Ridge

Yadong Zhou^{1,2}, Ruiyan Zhang¹, Dongsheng Zhang¹, Bo Lu¹, Rongcheng Lin³, Chunsheng Wang^{1,4,5}

¹ Laboratory of Marine Ecosystem and Biogeochemistry, Second Institute of Oceanography, State Oceanic Administration, Hangzhou, 310012, China

² yadong_zhou@sio.org.cn

³ Third Institute of Oceanography, SOA, Daxue Road No.178, Xiamen, China

⁴ State Key Laboratory of Satellite Ocean Environment Dynamics, Second Institute of Oceanography, State Oceanic Administration, Hangzhou, 310012, China

⁵ Corresponding author, e-mail: wang-sio@163.com or wangsio@sio.org.cn

The Southwest Indian Ridge (SWIR) is an important part of the only modern pathway between the Mid-Atlantic (MAR) and Pacific ridge systems. Here, we report fauna compositions from 3 vent fields of different environmental conditions on SWIR. A total of 35 taxa have been identified. Longqi is the most explored one on SWIR, with 25 vent-endemic/-associated species collected or observed, including 6 new species unreported in previous studies. A distinct ampharetid-based (*Amphisamytha* sp. 2) assemblage on an inactive chimney is found, where no other megafauna is observed. Ten megafauna are found at Duanqiao. Most of them are also present at Longqi except for the *Desbruyeresia* sp. Interestingly, another morphotype of the scaly-foot gastropod with black shell and white sclerites is discovered. Fifteen taxa are found at Tiancheng, with *Bathymodiolin* mussels, two species of actinostolid anemones and one species of small anemone dominated over different subareas. In addition, two methods, network theory and multivariate regression tree (MRT), are applied to an assembled and updated database to address the biogeographic placement of SWIR hydrothermal vents at global scale at genus level. The resulting pattern derived from network theory reveals that the three vent communities on SWIR fall among MAR, ESR (East Scotia Ridge) and CIR (Central Indian Ridge), showing closest connections to CIR. Although CIR, together with SWIR, tends to be placed in one single province in MRT analysis, the network topology does not identify CIR+SWIR, MAR and WP (West Pacific) as three robust individual provinces, in contrast with the previous study. This pattern is consistent with the role of SWIR as corridor between MAR and WP and also the proposed current closure of pathway between ESR and SWIR.