Active and Relict Hydrothermal Mineralization at the Longqi-1 field, Southwest Indian Ridge

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The Longqi-1 hydrothermal Field located at 49˚39'E, 37˚47'S, was the first active vent field documented along the ultra-slow spreading Southwest Indian Ridge [1]. The field consists of two major zones (the S and M zone) of venting sites at water depth of 2900~2700m, situated along the NW-SE trending mountainside on the junction point of a small non-transform offset and ridge valley. Actively venting high-temperature sulfide mounds and former high-temperature structures were widely spread in both S and M zone with maximum temperature at vent site DFF6 of 'M zone' up to 379.3 ˚C while low-temperature diffusing chimneys were much more popular in S zone. The distribution extents of hydrothermal activities in both 'M' and 'S' zones were approximately 200m×200m, respectively, supposed to be one of the largest hydrothermal venting system in the Mid-Ocean Ridges.

A wide range in ages of sulfide sample of one relict chimney (1.29kyrs, 2.8~3.0kyrs, 44.96kyrs and 98.9kyrs before present (BP)) and one massive sample(15.99kyrs BP) from M zone, reflect several periodic venting of hydrothermal fluids that make up the mound structures. Two chimney samples in S zone show age of 0.28~0.54kyrs BP and 6.16~19kyrs BP, respectively, and one massive sample show ages between 14.9kyrs and 54.2kyrs, reperesenting sustained fluid supply for a long history. These active and relict hydrothermal mineralizations are all located on the hanging wall of the detachment of Dragon Flag OCC[2]. The periodic precipitation of hydrothermal fluids may be related to the different fault phases. The measured age range and distribution extents hydrothermal activities in the 'M' and 'S' zones which are comparable to those of the largest hydrothermal venting system in the Mid-Ocean Ridges.

[1]Tao, C. *et al., (2012), Geology, v.* **40**, no. 1, p. 47-50.
[2] Zhao, M. *et al.,(2013), Geochem. Geophys. Geosyst., v.*14, no.10, p.4544–4563