

## Hydrothermal activities around 63-64°E, Southwest Indian Ridge

TAO CHUNHUI<sup>1</sup>, LIANG JIN<sup>1</sup>, LI XIANGYANG<sup>2</sup>, YANG YANG<sup>3</sup>, LI HUAIMING<sup>1</sup>, LIAO SHILI<sup>1</sup>, DENG XIANMING<sup>1</sup>, ZHANG GUOYING<sup>1</sup>, ZHOU YADONG<sup>1</sup>

<sup>1</sup> Key Laboratory of Submarine Geosciences, the Second Institute of Oceanography, Hangzhou, China

<sup>2</sup> China Ocean Mineral Resources R&D Association (COMRA), Beijing, China

<sup>3</sup> Key Laboratory of Ocean and Marginal Sea Geology, Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, Guangzhou, China

The eastern part of the Southwest Indian Ridge (SWIR) is characterized by very low magma supply with lower mantle temperature and thinner crustal thickness[1]. Besides the relict Mt. Jourdanne hydrothermal field investigated by submersible Shinkai 6500 in 1998[2], two other fields (Tiancheng and Tianzuo) were discovered by COMRA Cruise in 2009 [3] and surveyed again by Chinese submersible Jiaolong in 2014–2015.

The Tiancheng field (63°55'E/27°51'S) is the first low-temperature diffuse flow field confirmed along the SWIR. Temperature of 14°C was detected within the vent hosted by basalt. Numerous hydrothermal animals such as mussels, gastropods, crabs, barnacles, and anemones dominate the biological taxa of this field, distinct from those of Longqi-1 high-temperature field at 49.6°E of SWIR, indicating different community structure. Distribution of the these diffuse flow is about ~100m in diameter. The Tianzuo field (63°32'E/27°57'S) lies in the valley to the west of Tiancheng. It is an inactive sulfide field hosted by ultra-mafic rocks, mainly composed of serpentinized lherzolite. Opal and red-brown sediments widely cover the field, with no significant sign of activity. Pyrrhotite, pyrite, and minor chalcopyrite are the main sulfide minerals in the partly altered massive sulfide samples. The average contents of Cu, Zn, Au, and Ag in the sulfides are 2.47wt%, 0.002wt%, 0.645 ppm and 0.42 ppm, respectively. Distribution of ancient hydrothermal activity in Tianzuo field covers an area of approximately 800m×530m. Systematic geological survey and sample along the cold ridge segment of the SWIR imply that economic sulfide deposition may be rather promising along the ultra-slow spreading ridge.

[1] Sauter, D. *et al*, (2013), *Nature. Geoscience*. v.6, no.4, p. 314-320. [2] Münch U. *et al*, (2001), *Chem Geol*. v. 177, p.341–349. [3] Tao, C. *et al*, (2014), *Chin. Sci. Bull*. v.59, no.19, p. 2266–2276.