

## Revisit of hydrothermal systems in the Valu Fa Ridge, Lau Basin, southwest Pacific

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Hydrothermal systems associated with Lau-Kermadec arc-back system in SW Pacific were studied during YK04-09 cruise using RSV SHINKAI6500. Several hydrothermal fluids were collected during 18 dives and studied in order to clarify geochemical characteristics of hydrothermal systems.

At Vai Lili site in the CVFR (Central Valu Fa Ridge), significant decline of the hydrothermal activity since the first discovery at 15 years ago was notified in the fluid geochemistry as well as the measured temperature. Only diffuse discharging from foot of chimneys was found (the highest temperature was 88C), which fluid chemistry indicates subseafloor mixing between the hydrothermal fluid and entrained seawater. Diffuse shimmerings (T=35-50C) were found within the whole area of 400m length, which accompany orange-yellow color patch probably of Fe oxides, indicating hydrothermal activity has been declined but not yet completely ceased.

At Mariner site which is located about 4km north of the Vai Lili site, vigorous fluid venting smokers (the highest temperature was 365C) clustered within a small diameter less than 100m. Not only black smokers, white smokers vigorously venting with white and black particles, diffuse clear shimmering from the foot of chimneys, and also dead chimney structure covered with microbial mats were identified. Based on the analytical results of the collected samples, two hydrothermal endmembers caused by phase separation were identified. The Mariner site hydrothermal fluid is characterized by strong acidity, with pH as low as 2.4 (room temperature measurement). The negative alkalinity of the fluid (lower than -2 mM) corresponds to this low pH, strongly suggesting involvement of a strong acid of magmatic volatiles. Notable high concentration of metal elements are supported by this low pH, high temperature and high Cl concentration.