Unique shallow-water hydrothermal system associated with submarine volcanism in the Aira caldera, South Kyushu, Japan

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Shallow submarine hydrothermal activities were confirmed in the seafloor at 200 m water depth within the Wakamiko crater (31°40'N, 130°46'E) in Kagoshima Bay, south Kyushu Japan. This crater is considered a main crater of the Aira caldera, which is formed as a result of last huge eruption about 2.5ka. This area is also kown active fumarolic gas discharge, suggesting the Aira cladera is still an active volcano. Fluid and sediment samples have been extensively collected during dive programs using ROV/HyperDolphin and surface ship surveys using Tansei-Maru of JAMSTEC, and studied to reveal geochemical signature of the hydrothermal and fumarolic activities.

In the northwest area of the crater, high temperature active fluid venting (Tmax = 200°C) was discovered in June, 2007 [1]. White patch area nearby the vent field was observed, where the pore fluid chemistry shows mixing between the ascending hydrothermal fluid and seawater [3]. On the other hand, weak fluid emanation from a hydrothermal mound was observed in the east area [2]. Occurrence of montmorillonite in the mound sediment is considered as not stable for the present pore fluid chemical composition, which may be a result of fluctuation of fumarolic gas flux through the surface sediment [3].

In addition, fumaroles are extended out of the crater, the atop of knoll adjacent to the crater is one of the active areas. *Vestimentiferan* tube-worms inhabit near the fumaroles at 100 m water depth. It is inferred that they depend on the gas flux instead of the hydrothermal fluids.

[1] Yamanaka *et al.* (2007) *EOS Trans. AGU*, **88(52)** Fall Meet. Suppl., Abstract V21D-0756. [2] Ishibashi *et al.* (2008, in press) *J. Volcanol. Geotherml. Res.* [3] Nakaseama *et al.* (2008, in press) *Resource Geology*.

Collapse of the Songpan-Ganze Orogenic belt and Mesozoic mid-crustal ductile channel flow: Evidence from the Longmenshan foreland thrust belt

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The early Mesozoic orogeny in the Songpan-Ganze region, SW China produced crustal thickening (~50–60 km), followed by regional extension and crustal thinning. The regional extension involved ductile deformation and metamorphism of the Sinian-Paleozoic strata around extensional domes within the Longmenshan area. This extensional deformation removed or selectively thinned the strata. The deformed rocks are marked by ductile shear zones, bedding penetrative foliation and mineral lineation. The kinematic markers indicate SSE- or south-ward motion in the northern part of Longmenshan and SE-ward motion in the middle and southern sections. The mylonitic rocks have greenschist to low amphibolite facies mineral assemblages and P-T conditions in the Silurian Maoxian group are estimated to have been 265-405°C and 0.31-0.48 GPa, consistent with a mid-crustal ductile channel flow. Previous studies placed the age of metamorphism at 190–150 Ma using $^{39}Ar/^{40}Ar$ and SHRIMP U-Pb methods. We conclude that the thickened crust was thinned by mid-crustal ductile channel flow, which then led to collapse of the Mesozoic Songpan-Ganze orogenic belt.