



CO₂ soil flux from Liu-huang-ku hydrothermal area, northern Taiwan

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Different tectonic models have been proposed to explain the magma activity in northern Taiwan. Available results show that the latest eruption occurred ca. 20 ka in Tatum volcanic area, where hydrothermal activity is still active. Moreover, recent micro-seismic and helium isotopic data inferred that a magma chamber may exist underneath northern Taiwan. Thus, it is an important and urgent task to surveillance the magma activity in this area.

Liu-huang-ku (LHK) area, where is close to Taipei basin and exhibits fumaroles and hot springs, was chosen as testing location in this study. CO₂ flux was measured by closed-chamber method with a non-dispersive infrared detector (NDIR). The preliminary result shows that closed-chamber method is suitable for measuring CO₂ flux in the Tatum volcanic area. CO₂ flux ranges from 0.30 to 7402 g m⁻² day⁻¹. Estimation of total CO₂ emissions in LHK is ca. 18.2 t day⁻¹ and 608 t km⁻²day⁻¹, respectively. It is similar with those of other hydrothermal areas with high CO₂ flux in the world. Helium isotopic data reveal that the soil gas is mainly derived from a mantle derived component and is mixed with the air component. Although regional flux may be controlled by physical properties of soils in one area, the result of contour map of the CO₂ flux shows that local tectonic structures still control the distribution of flux in LHK area. Meanwhile, the CO₂ abundance shows positive correlation with the helium isotopic composition and total sulfur concentrations in the soils. It indicates that CO₂ could be a good proxy for future monitoring in this area.