Geophysical Research Abstracts
Vol. 12, EGU2010-9132, 2010
EGU General Assembly 2010
© Author(s) 2010

Gas Compositions and He-C Isotopic Ratios of Fumarolic Samples from Negros Island, Central Philippines

Hsiao-fen Lee (1), Tsanyao Frank Yang (1), Tefang Faith Lan (1), Yue-Gau Chen (1), Jaime S. Sincioco (2), and Renato U. Jr. Solidum (2)

(1) National Taiwan University, Geosciences, Taiwan (d94224006@ntu.edu.tw, tyyang@ntu.edu.tw, f92224105@ntu.edu.tw, ygchen@ntu.edu.tw), (2) Philippine Institute of Volcanology and Seismology, Department of Science and Technology, Quezon City, Philippines

Four volcanoes that are distributed in the Negros Island, Central Philippines, include Kanlaon Volcano which is considered as one of the most active volcanoes in Philippines. All of these volcanoes are related to subduction system of Negros trench and form the Negros volcanic arc. Besides Kanlaon, from north to south, the volcanoes in Negros Island are Silay Volcano, Mandalagan Volcano and Cuernos de Negros Volcano. Although there is no eruption record of these three volcanoes in last 10,000 years, due to the ongoing solfataric/fumarolic activities, the Philippine Institute of Volcanology and Seismology (PHIVOLCS) classifies these as "potentially active" volcanoes. It means that there is still a considerable threat and risk of eruption.

Fumarolic gas samples and bubbling gas samples of hot spring were collected in February 2007 and April 2008 to compare the compositions with others in the world. We analyzed the gas composition, carbon isotopes of CO_2, and helium isotopes of these samples. The results of these samples show a similar composition as those of low-temperature fumaroles in other parts of the world, i.e., temperature $< 200\ ^oC$, and $H_2S/SO_2 \quad > 1$. H_2O is the major species of these gas samples, and CO_2 is the dominant component after de-watering. Minor components include H_2S, N_2 and CH_4. The gas composition of most of these samples falls in the range of affinity with convergent plate gases associated with groundwater based on the plot of N_2-He-Ar diagram. The high $^3He/^4He$ ratios indicate a mantle-derived degassing source in origin, i.e., magma chambers could still exist beneath these volcanoes. Helium isotopes ratios show a decreasing trend from north to south, such distribution could be due to more crustal contamination caused by the collision event which happened in the northern part of the island. The carbon isotopic values of CO_2 are far less negative than the values from a magma source. There are other carbon sources of CO_2, most likely a thick sequence of limestone formation in Negros Island. When CO_2 rise from magma to surface, it reacts with the limestone formation so that carbon isotopic values are changed. The outlet temperature of fumaroles and hot springs ranged between 28 $^\circ$ and local boiling, and did not show significant variations between 2007 and 2008, which implies the de-gassing systems might be quite steady.