



Hot Spring Water and Volcanic Gases to Evaluate the Volcanic Activity of the Mt. Baekdu, Korea

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This study performed the analysis on the volcanic gases and hot spring waters from the Julong hot spring at Mt. Baekdu, also known as Changbaishan on the North Korea(DPRK)-China border, during the period from July 2015 to August 2016. Also, we confirmed the errors that HCO_3^- concentrations of hot spring waters in the previous study (Lee et al. 2014) and tried to improve the problem. Dissolved CO_2 in hot spring waters was analyzed using gas chromatograph in Lee et al.(2014). Improving this, from 2015, we used TOC-IC to analysis dissolved CO_2 . Also, we analyzed the Na_2CO_3 standard solutions of different concentrations using GC, and confirmed the correlation between the analytical concentrations and the real concentrations. However, because the analytical results of the Julong hot spring water were in discord with the estimated values based on this correlation, we can't estimate the HCO_3^- -concentrations of 2014 samples. During the period of study, CO_2/CH_4 ratios in volcanic gases are gradually decreased, and this can be interpreted in two different ways. The first interpretation is that the conditions inside the volcanic edifice are changing into more reduction condition, and carbon in volcanic gases become more favorable to distribute into CH_4 or CO than CO_2 . The second interpretation is that the interaction between volcanic gases and water becomes greater than past, and the concentrations of CO_2 which have much higher solubility in water decreased, relatively. In general, the effect of scrubbing of volcanic gas is strengthened during the quiet periods of volcanic activity rather than active periods. Meanwhile, the analysis of hot spring waters was done on the anion of acidic gases species, the major cations, and some trace elements (As, Cd, Re). This work was funded by the Korea Meteorological Administration Research and Development Program under Grant KMIPA 2015-3060.