## Volcanic Gas at Mt Hakone, Japan

T. OHBA1\*, M. YAGUCHI1 AND Y. DAITA2

 <sup>1</sup>Tokai Univ., Hiratsuka 259-1292, Japan (\*correspondence: takeshi\_ohba@tokai-u.jp)
<sup>2</sup>Hot Springs Res. Inst. Kanagawa Pref., 250-0031, Japan

In January 2013, a swarm of earthquakes took place within the caldera of Mt Hakone, Japan. After the swarm we have started the periodical sampling and analysis of fumarolic gas at Owakudani geothermal area developed on one of the central cones of caldera. In April 2015, another earthquake swarm occurred at the same area. Two months prior to the start of the swarm in 2015, a significant decrease in the isotope ratio of H<sub>2</sub>O ( $\delta$ D) was detected (Fig. 1). Just after the start of earthquake swarm, the  $\delta$ D turned to increase. The CO<sub>2</sub>/H<sub>2</sub>O ratio of fumarolic gas increased after the start of earthquake swarm (Fig. 1).

The variation in  $\delta D$  indicates the change in the fraction of magmatic water in hydrothermal system developed between a degassing magma and surface. The decrease in  $\delta D$  suggests the reduced fraction of magmatic water prior to the earthquake swarm. A plausible model for the reduction is the development of sealing zone covering the degassing magma [1]. The sealing zone blocked the release of magmatic gas. The gas within the sealing zone compressed the magma. The increase in the degassing pressure of magma lowered the relative content of H<sub>2</sub>O in gas due to the pressure dependence of H<sub>2</sub>O solubility in magma, which could be the increased CO<sub>2</sub>/H<sub>2</sub>O ratio of fumarolic gas.

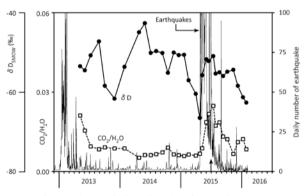


Figure 1: Variation in the fumarolic gas at Owakudani geothermal area of Mt Hakone. The daily number of earthquake was observed by Hot Springs Research Institute, Kanagawa prefecture. The small arrow indicates the time of steam eruption on 30th July 2015.

[1] Fournier (1999) Econ.Geol., 94,1193-1211.