

Hydrogen, oxygen, carbon and sulfur isotopic ratios in groundwater after the 2000 volcanic eruption in Miyakejima Island, Japan.

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1. Introduction

In Miyakejima Island, Japan, where the 2000 volcanic eruption started on June 2000, monitoring of groundwater level, temperature and electric conductivity and sampling of spring water and pond water have been continued by Geological Survey of Japan / AIST (GSJ/AIST) since September or October 2000 (Sato et al., 2001b). The monitoring stations are located at MYT and MYN in Fig.1, and water samples were collected at the springs of s1 - s4 and s8 - s12 and at the pond of MYT (Tairoike). The monitoring data have been transmitted via the satellite communication, and the data can be seen as several figures in the GSJ/AIST web site (The URL is described below). The temperature, pH and electric conductivity of the spring and pond waters were measured at the time of sampling, and the major chemical composition and stable isotopic composition (dD, d18O, d13C and d34S) were analyzed. In this manuscript, we show the preliminary results until July 2001.

2. Hydrogen and oxygen isotopic ratio of spring and pond waters

The range of the dD and d18O values in the spring waters of s1, s2, s3, s4, s10, s11 and s12 are from -42 to -31 per mil and from -7.3 to -6.2 per mil, respectively. As for d18O, the values are consistent with those in the rain waters from -7.1 to -5.8 per mil which obtained at the 14 sites from July 1994 to July 1995 by Machida (2000). On the other hand, the dD and d18O values in the pond water of MYT are -26 and -4.8 per mil on average, respectively, and the values are much larger than those of the spring waters. The difference might be generated by evaporation. The range of temporal fluctuation of dD and d18O in the five samples at s11 are within 4.0 and 0.35 per mil, respectively.

3. Carbon stable isotopic ratio of spring and pond waters

The range of the d13C values of bicarbonate ion in the spring waters collected on July 2001 are from -18 to -9 per mil. On the other hand, the d13C value in the pond water of MYT is +5.3 per mil. These results are not consistent, which may show existence of the different sources of bicarbonate ion in the spring and pond waters. The analysis was also done for the samples collected at s1, s11 and MYT on October 2000. In comparison with the d13C values on July 2001, no change at s1 and s11 and an increase from +1.5 to +5.3 per mil at MYT are seen.

4. Sulfur isotopic ratio of spring and pond waters

The range of the d34S values of sulfate ion in the spring and pond waters collected on July 2001 are from +4 to +11 per mil. In comparison with the d34S values on October 2000 as well as d13C, marked decreases (s1: +11 to +8.4 per mil; s11: +11 to +8.6 per mil; MYT: +11 to +7.7 per mil) are seen. Sato et al. (2001a) showed that the range of the d34S values of ash leachates were from +5.5 to +8.0 per mil. The ash samples were collected from August to September 2000. The decreases of the d34S values in the water samples might show occurrence of mixing with sulfate ion which originated in volcanic ash from the Miyakejima volcano.

References

- URL of the groundwater monitoring: http://gxwell.aist.go.jp/GSJ_E/
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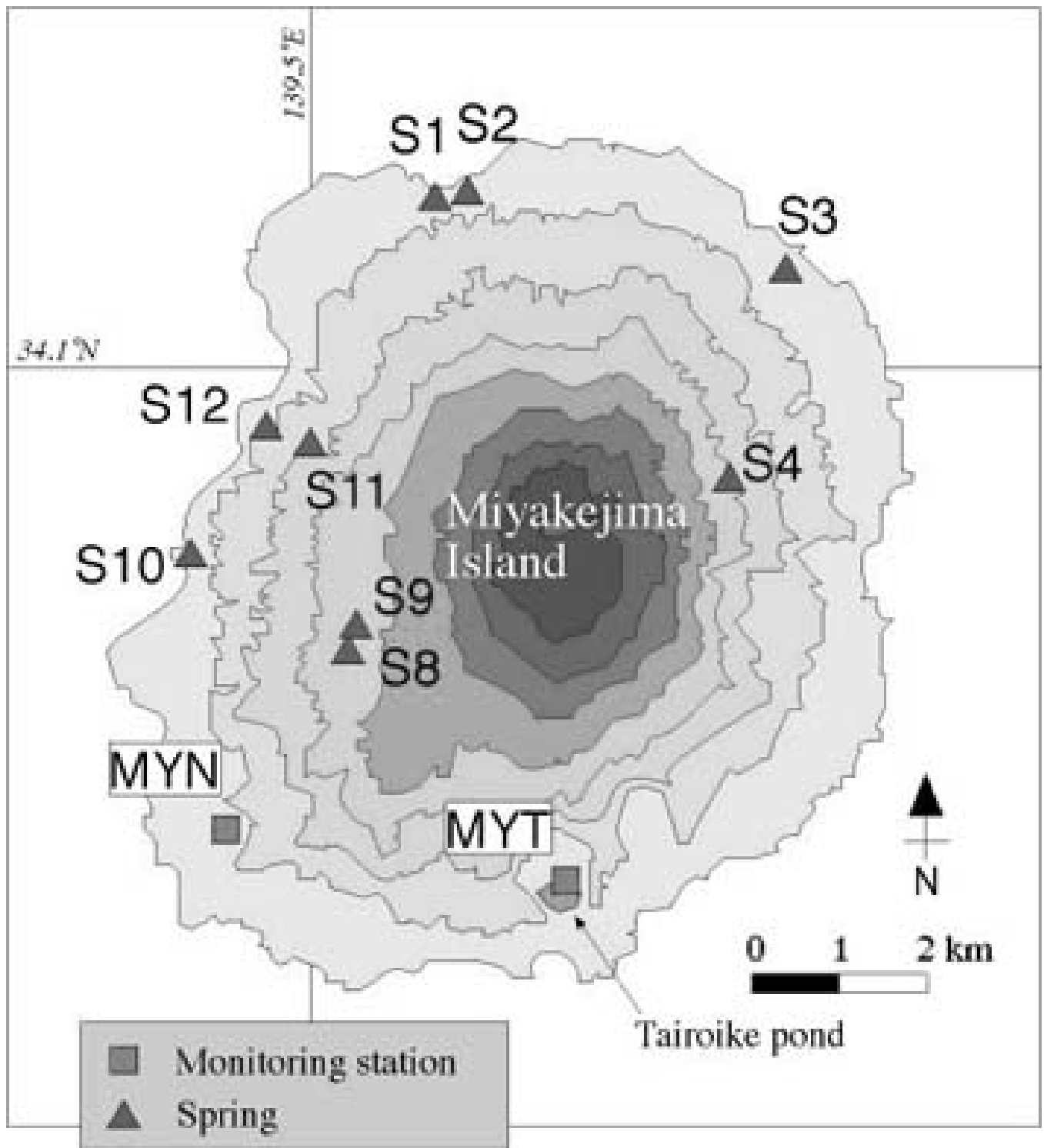


Fig.1 Map of Miyakejima Island, Japan