

## On the residence time of lake water and spring water in Mashu volcano

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Lake Mashu which is the closed lake in Japan located in the east of Hokkaido was formed by the accumulation of water in the caldera area depressed by the eruption of Mashu volcano about 7,000 years ago. In this lake, transparency of 41.6 m was observed in 1941, and even now it still has a transparency of 20 to 30 m on average. It can be considered that the influence of human activity is small. The seepage water of the closed lake is considered that is recharged the surrounding groundwater as a part of origin. This study is carried out to make clear the residence time of lake water in Lake Mashu and spring water around the Mashu volcano. The values of 3H of depth water of 100 m and 200 m in the lake was 3.3, 3.5 TU. In addition, from the analysis results of substances originating from human activities such as CFCs also showed values close to the atmosphere. Therefore, it was suggested that the atmosphere was dissolved from the surface layer to the bottom of the lake, and the lake water was completely mixed. It seems that the lake water permeates and there is an influence on the surrounding spring water.

Approximately 20 points of spring water are confirmed around the Mashu volcano.  $\delta^{18}O$  and  $\delta D$  of the water around the northern area are from -10.77 to -10.89 ‰, from -70.66 to -72.19 ‰, and the southwestern area are from -10.25 to -10.43 ‰, from -66.99 to -67.79 ‰, southeastern area are from -9.06 to -9.36 ‰, from -62.95 to -63.50 ‰.  $\delta^{18}O$  and  $\delta D$  of the lake water in Lake Mashu are from -7.06 to -7.40 ‰ and from -49.28 to -51.02 ‰. As a result, it was revealed that spring water on the southeastern area slope was strongly related to Lake Mashu. The 3H of a spring water on the southeastern area is 2.7 TU, which was lower than the lake water. Both of the lake water and the surrounding spring water are at the same level as the rainfall since the 1980s, so it seems that it is strongly influenced by the recharge by the recent precipitation.

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