

## Dissolved gas composition changes by degassing processes

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Japan Atomic Energy Agency (JAEA) has been implementing Horonobe Underground Research Laboratory Project for understanding of characteristics of the geological environment on high-level radioactive waste disposal in Japan. In Horonobe area, borehole investigations were carried out. The Horonobe area is located on the eastern margin of the Neogene to Quaternary sedimentary basin located on the western side of northern Hokkaido. The basin grades upward stratigraphically from the Wakkanai Formation (siliceous mudstones with opal-CT), to the Koetoi Formation (diatomaceous mudstones with opal-A, but not opal-CT), to the Yuchi Formation (fine to medium grained sandstones), and lastly to the Sarabetsu Formation (alternating beds of conglomerate, sandstone and mudstone, intercalated with coal seams), overlain by late Pleistocene to Holocene deposits.

In this study, we present characteristics of the dissolved gas compositions obtained at the time of borehole investigations from a written report (e.g., Ota *et al.*, 2010, JAEA-Research). The major components of the dissolved gas were CH<sub>4</sub> and CO<sub>2</sub>. The methane and carbon dioxide are almost microbial. The production rate of Ar in this area are negligible, compared with the rate of CH<sub>4</sub> and CO<sub>2</sub>. In order to investigate variations of CH<sub>4</sub> and CO<sub>2</sub> in this area, the concentrations of CH<sub>4</sub> and CO<sub>2</sub> were normalized by dividing those by that of Ar.

A linear correlation, which slope was c.a. 8, was obtained by plotting CH<sub>4</sub>/Ar concentration ratios versus CO<sub>2</sub>/Ar ratios (Fig. 1). Therefore, spatial distribution of the mass ratio of dissolved CH<sub>4</sub> and CO<sub>2</sub> in this area seems to be homogeneous. Samples tend to be plotted at the upper right with increasing depth because CH<sub>4</sub> and CO<sub>2</sub> were accumulated with increasing depth where the residence time of groundwater is large.

Keywords: dissolved gas, degassing, methane, carbon dioxide

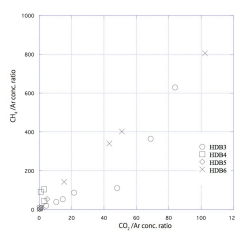


Fig. 1 Plots of gas concentration ratios. Samples tend to be plotted at the upper right with increasing depth.