Chemical and isotopic studies of precipitation in Toyama, northern Central Japan

N.OKAKITA[1], K. IWATAKE[1], H. HIRATA[1], A. ODA[1] AND A.UEDA[1]

[1]University of Toyama, 3190, Gofuku, Toyama, 930-8555, Japan
(*correspondence: m1341504@ems.u-toyama.ac.jp)

In Toyama Prefecture, northern Central Japan, the averaged air temperature is 0 °C in winter and extends to 35 °C in summer. The water temperature of groundwater in Toyama is constant to be 12 to 15 °C throughout year and can be used for heat source of air conditioning of houses and industry by using the temperature difference between air and groundwater. There are three big groundwater aquifers, Kurobe River, Toyama City and Sho River alluvium fans from eastern to western parts in Toyama. To examine the water quality of local precipitation and the degree of the contribution to groundwater aquifers in these fans, chemical and isotopic (D, ^{18}O) compositions of precipitations and groundwaters at 8 observation sites in Toyama have been analyzed The δD and $\delta^{18}O$ values are -60.0 to -55.0 and -9.7 to -8.7 ‰, respectively. The degree of the contribution of local precipitation can be estimated to be 13 to 95 %, 0 to 97 % and 5 to 96 % for Kurobe River, Toyama City and Sho River fans, respectively.

The pH of the precipitations are lower than 6. The Na and Cl concentrations show high values at the winter time due to sea spry from the Japan Sea. The total dissolved ions (TDS) in the precipitation are less than 120 mg/L. In contrast, groundwaters in the three fans are of a Ca-HCO_3 type with 54 to 323 mg/L TDS. This means that local precipitation infiltrates into the fan deposits and is enriched in Ca and HCO_3 by dissolving carbonate rocks in the underlying formations.