

Geochemical study of groundwater in Ikinoshima island

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In order to reveal the chemical characteristics, groundwater in Ikinoshima Island was studied. Groundwater samples were collected from wells (18 points) and bores (20 points), in October 2003 and June 2004. Major elements compositions showed the groundwaters are intermediate between Na-Cl type and Ca-HCO₃. The analytical results of eight major elements concentrations (Na, K, Ca, Mg, Cl, SO₄, HCO₃, NO₃) were statistically examined using principal components analysis. The first factor showed high positive loading on major elements including Na, Ca, Mg, Cl, and HCO₃ with the proportionate contribution of 37.1%, and attributed to represent size effect. The second factor showed high positive loading on Na and Cl, and negative loading on Ca, Mg, and HCO₃ with the proportionate contribution of 27.2%. Therefore, the second factor is an important factor to classify Na-Cl type and Ca-HCO₃ type. The third factor showed high loading on NO₃ and K with the proportionate contribution of 13.4%, and it would reflect human activities.

Shallow groundwaters collected from the wells are Na-Cl type. Based on the isotopic composition, addition of Na-Cl is not attributed to seawater intrusion into the groundwater, but to influence by sea salt particle involvement. On the other hand, deep groundwaters collected from bores are Ca-Mg-HCO₃ type. Interaction with basalt that is dominant in the Ikinoshima Island is responsible for Ca-Mg-HCO₃ type. Groundwater of Na-HCO₃ type formed by evolution of groundwater was not found in Ikinoshima Island.