

Geochemical characteristics of water of Asahi River flowing through Akita Plain

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Abstract

The purpose of this study was to clarify the formation process of chemical composition of river water in Asahi River flowing through Akita Plain. Concentrations of major elements and heavy metal components in the water of Asahi River were measured using ion chromatography and the PIXE method. Concentrations of major elements and iron in the river water increase from the headwater to the lower reach of the river. Zn concentration of the river water is high at the point where a tributary derived from a Cu-Ag mining area flows into, and the Zn concentration decreases below 0.03ppm at a point 14.6 km downstream. The Na/Cl ratio of the river water is similar to the Na/Cl ratio of seawater. The river water contains salt of seawater origin. The K/Na, Ca/Na, Mg/Na and SO₄/Cl ratios of the river water are different from those of seawater. These findings suggest that the concentrations of K, Ca, Mg and SO₄ are controlled by other factors in addition to the salt of seawater origin. Concentrations of Ca, Mg and SO₄ of non-seawater origin in the river water increase from the headwater to the lower reach of river. The increases in these concentrations suggest that Ca, Mg and SO₄ concentrations of the river water are controlled by water-rock interaction and that the amount of groundwater that has interacted with rocks for a long time in the river water increases in the downstream direction. Fe concentration of the river water increases in the downstream direction. Fe in the river water is thought to be transported as suspended particles smaller than 0.45 μm in diameter.