

Mixing processes between river water and acidic hot spring water in Shibukuro-Tama river

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In the Shibukuro and Tama River system, Akita, river water is acidified by inflow of acidic hot spring water (pH=1.2, T=98 °C). 80% of hot spring water is fed into a neutralization plant and neutralized with limestone. The effluent is released into the Shibukuro River. Sulfur isotopic ratio of Tamagawa hot spring water is 31.8 ‰, and Sr isotopic ratio of the neutralized effluent is 0.7068. These higher isotopic ratios and lower ratio of river water as well as the chemical composition of dissolved components lead to understanding of mixing process of confluent river water. The mixing ratio of waste water with Shibukuro River water was estimated 1 to 1, and at the confluence of Shibukuro and Tama Rivers the mixing ratio of these two was estimated 3 to 7 or 4 to 6. These mixing ratios were consistent with those obtained from the concentrations of dissolved chemical components. These consistent mixing ratios suggest that the chemical composition of river water was mainly controlled by the mixing of the waste water and the tributary river waters, and the influence of precipitation of insoluble salts was negligible. The contribution of the waste water was about 10% at Tose located down the confluence of Shibukuro and Tama Rivers.