

Strontium isotope map of terrestrial water of the Japanese Archipelago based on the geological model

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Strontium isotope ratios ($^{87}\text{Sr}/^{86}\text{Sr}$) of terrestrial water exhibit regional variations in relation to geology of catchments. Since these variations can be reflected to the values of plants and animals, strontium isotope ratios are useful in many fields, such as geochemistry, ecology, environmental science, and archaeology. We made strontium isotope maps generated from bedrock and water model based on a geological map using a GIS. Strontium isotope map of bedrock was calculated using a strontium isotope evolution model of crust, which is a function of abundances of rubidium and strontium, and the age of the rocks. Bedrock model gave large geographical variations of the strontium values (0.704-0.724). Strontium isotope ratios of water were calculated using concentrations of strontium in rocks, estimated weathering rates, and flux and flow direction of waters. The results of water model correlated well with the values of bottled waters that were collected from the Japanese Archipelago (170 samples: 0.704-0.712). This indicates that strontium isotope ratios of terrestrial waters can be estimated from the bedrock and water model.

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