

Geochemistry of river waters collected from the Okayama and Tottori Prefectures, Japan

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A detailed geochemical and isotopic study of river waters from the Okayama and Tottori Prefectures, Japan, has been undertaken in order to evaluate the water-soil (rock) interaction, as well as human impact on the geochemical nature of the river water. A total of 646 samples were collected from 442 locations since 2011. The pH, EC, and water temperature were measured on site, and the major dissolved components, trace element (47 elements) concentrations, and O-H-S-Sr isotope ratios were measured in the laboratory. These data are being used to construct the geochemical maps of the river water of the two prefectures.

In 2017, we focused on the investigation of the central to western Tottori Prefecture. The river waters in the area are generally characterized by high Rb and Cs concentrations, which likely reflect the presence of dacitic lava and volcanic sediments of the Daisen volcano. A similar pattern is also observed for Si and V concentrations.

The oxygen isotope ratio displays a clear altitude effect. The d-excess value is high in the northern Okayama and Tottori Prefectures (>20), compared to the southern Okayama prefecture (5~15). This regional variation can be explained by taking into account the oxygen and hydrogen isotope ratios of the meteoric water (Mao 2017), as well as the sharp contrast in the amount of rainfall during the winter season.

The concentrations some elements such as Ca, Cr and Ni also display regional variations that seem to correlate well with the geochemical characteristics of rocks exposed in the area. On the other hand, the concentrations of other dissolved constituents such as SO₄ and NO₃ seem to correlate better with the population density. The high resolution geochemical maps of these, as well as other representative elements and isotopes, will be presented at the meeting.

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