

Geographic distribution in stream dissolved elements on the transects of W-E and S-N around Hiroshima prefecture

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The objective of this research is to confirm spatial variation properties of the solute discharge process in small watersheds in Chugoku district, western Japan. We collected more than 200 water samples at streams with small watershed area in Ashida river, Ohta river, Gono river systems, western Japan. Especially, we analyzed sulfur isotopic ratio as well as major element concentrations.

The results are summarized as follows,

1) Bicarbonate concentration decreased with the altitude in all river systems. The relationship in Ashida river system between altitude and concentration included larger dispersion and the gradient of the correlation line was larger than others, respectively. These results suggested the longer residence time by the lower recharge rate with annual rainfall amount. In addition, the lower recharge rate would control to the lower groundwater level in the catchment and the deeper groundwater flow through the fractured bedrock would also cause the variation of dissolution originated in various bedrocks.

2) Sulfur isotopic ratio had the variation based on the various sources, for example rock minerals, fertilizer, and atmospheric deposition originated in sea salt and pollution. The average value of sulfur isotopic ratio in Ashida river system was lower than others by the contribution of the pyrite mineral with low value. In case of Ota river, the average value was a little bit lower than that in Gono river, by the small contribution of sea salt with the high value.

3) The sulfur isotopic ratio and sulfate concentration suggested the contribution of Chinese atmospheric pollution in the mountain ridge area. In addition, these indicated the possibility of the influence of the atmospheric pollution originated in the oil industries around Hiroshima city and steel industries around Fukuyama city, and agricultural pollution in rural area, respectively.