The influence of geology on river water quality and chemical loads in Oshika Village, Nagano, Japan

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Ohshika Village, Nagano Prefecture, central Japan is characterized by various types of rocks with different chemical composition, different grade of metamorphism, ages and origins. It is expected that these rocks and geological conditions may control water quality and chemical loads of the rivers across the village. The purpose of this study is to clarify the relationship between the river water quality/loads and geology through analyses for major ions and heavy metals.
From the trilinear diagram, water quality in the study area proved to be characterized by the Cl^-, Ca^{2+} and Mg^{2+} concentration. A large amount of Cl^- is loaded from the pelitic schist and green schist, while Mg^{2+} from the serpentinite. Also, a large amount of SiO_2 is loaded from the diorite, gneiss, sandstone and mudstone, and Ni is loaded when the river flows down the area composed of the serpentinite, pelitic schist, sandstone and mudstone. Little loading of SiO_2 was found from the serpentinite. The higher the areal proportion of the serpentinite in the drainage basin, the higher the Mg^{2+} concentration and the lower the Ca^{2+} and SiO_2 concentration of the river water.

Keywords: geology, river water quality and load, heavy metal, ultramafic rock, crystalline schist, granite

