

Study on the water quality of the Tenryu River and factors influencing the water quality

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The present study investigated the concentration of various elements in river water and sediments of the Tenryu water system and the speciation of the elements in the sediments from the geochemical point of view, and discussed the factors controlling the geochemistry of river water and sediments. The Tenryu River starts from Lake Suwa, and the lake water's COD is still more than the environmental standard value. The geyser that blows out from Lake Suwa, which is the largest in Japan, contains such elements as B and As above the environmental standard values and the amount of its discharge is as great as 720 L. Therefore, its effect was concerned in this study. In addition, the water quality of the Tenryu was comprehensively analyzed, using the Principal Components Analysis, which is one of the methods in Multivariate Statistical Analysis.

According to the results of the analysis, the elements contained in the river water were classified into two groups. One group includes those elements that are strongly diluted due to its tributary rivers in the upper stream, and these are the elements usually found in the geyser. Another group includes those elements whose concentrations stay almost constant from the upper stream to downstream, and these are the elements generally found in the rocks. The water quality analysis using B concentration revealed that those elements contained in the geyser are diluted simply in the Tenryu River water, and those elements contained in the rocks are supplied into the main stream from the tributary rivers. In addition, it was found that the proportion of the exchangeable and adsorbed fraction in the sediment of the most elements is high in the upper stream, while it is greatly decreased in the middle stream. This fact indicates that the sediment in the upper stream shows the strong effects of the geyser.

In addition, from the results of Principal Components Analysis, it is suggested that the degree of water contamination of the Tenryu River is improved through the process of the stream, while contamination caused by human factors are possibly taking place in the upper stream.