Geochemical study of river water in the Tanzawa Mountains

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We carried out quantitative monitoring of river water chemistry in the several river systems at Tanzawa Mountains, western part of Kanagawa Prefecture from May 2000 to January 2002. Analyses were done with ICP for cations (Na, K, Ca, Mg, Si and P), Ion Chromatography for anions (Cl, NO3, and SO4) and with the titration method (HCO3). The water samples were collected at the 40 points of the Sagami, Hanamizu, Sakawa river systems, at one point of the Miyagase Lake, and at four springs. From May 2001 to January 2002, we monitored monthly chemical variation of river water of four river systems, the Sakawagawa, Nakagawa, Nakatsugawa and Mizusawagawa.

Each of the river system studied exhibits distinct chemical characteristics. Between the river systems studied, the Sagami river system has higher pH and lower Na and Cl. The Hanamizu river system has higher Mg, Ca and Cl, and relatively low K and SO4. The Sakawa river system exhibits higher Na and SO4.

The data suggest that river water chemistry is apparently correlated to the geology of each river basin. The river water in the limestone area exhibit relatively higher Ca concentration. Higher K and lower Mg concentration and pH are noted in the water samples collected from the granite area. The samples from areas predominantly composed of volcanic rock contain higher SO4. Silicon concentration and pH are high in the samples from the sedimentary rock area.

The river systems in the area directly facing the Sagami Bay tend to have relatively higher Na concentration than those in the northern hinterland of the studied area separated by the watershed from the Sagami coast area. This is probably due to higher precipitation of sea salt aerosol onto the area facing to the sea.

Despite the Tanzawa river systems show variable concentration levels in elements analyzed, they exhibit similar seasonal variation of river water chemistry. Concentration of Na, K, Mg, Ca, and Si and pH in the water samples collected during the summer season are about 1.2-1.5 times higher than those observed during the winter season. The seasonal variation is partly attributed to relatively higher activity of water-rock and water-soil interaction during summer, which involve alkali dissolution from rock/soil into river water.