

Estimation of dissolved chemical loading flowing into Lake Issyk-Kul

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Abstract

For Lake Issyk-Kul, the rise in salt concentration has been confirmed before 1998, when water level declined due to evaporation condensation, but as for the factor that the salt concentration continues to rise even after 1998 when the water level turned to rise It is still unknown. The water quality formation mechanism of the saline lake is important in balancing the supply amount of each chemical component from the inflow river and groundwater and the amount that they are removed from the water, and the water quality of the inflow river and groundwater and the salinity concentration of the lake It is necessary to grasp the relationship with the rise. Therefore, in this research, major chemical components of samples sampled from Lake Issyk-Kul and its river water and groundwater during the summer of 2012 to 2015 were analyzed. In addition, the load amount of dissolved chemical components was calculated using weather data of the past 11 years and water quality data of river water.

River water in the Lake Issyk-Kul catchment area shows Ca-HCO₃ type. In this area, wastewater treatment facilities are inadequate, and Na, Cl, SO₄ and NO₃ concentrations are relatively higher in other river waters in areas where urban areas and upland fields concentrate. Groundwater shows different water quality types depending on the area, and there are Ca-HCO₃ type, Na-SO₄ type and Na-Cl type. The Na-SO₄ type and Na-Cl type are hot spring water, which are found in hot spring facilities in the southern part of Lake Issyk-Kul and east well. In particular, the Na-Cl type is three times the ion concentration of Lake Issyk-Kul, and it is thought that it influences the water quality formation of Lake Issyk-Kul. For loading from river water and groundwater, the TDS is 493×10^6 kg/y, which is required in 24758 years to reach the current water quality of Lake Issyk-Kul. In the future, considering the process of water quality formation of Lake Issyk-Kul, it is necessary to verify the load amount for each ion.

Keywords: Saline Lake, Arid Region, Major Chemical Component, Central Asia

