DETERMINATION OF CHEMICAL COMPOSITION OF SURFACE WATER IN THE YELLOW RIVER BASIN

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Abstract

A determination method of chemical composition of surface water in the Yellow River Basin is proposed in this study. Firstly, twenty-four groups of surface water samples were collected, and Cl^−, SO_4^{2−}, K^+, Na^+, Ca^{2+} were measured by ion chromatograph and inductively coupled plasma emission spectrometer (ICP-AES). The oxygen isotopic composition (δ^{18}O, δD) were measured by liquid water isotope analyzer. Temperature (T), pH, oxygen reduction potential (Eh), dissolved oxygen (DO), Total Dissolved Solids (TDS) and electrical conductivity (EC) were measured by multi-parameter water quality instrument. Experimental results showed that the surface water samples were alkaline. The cation content in surface water of the Yellow River was ranked as Na^+>Ca^{2+}>Mg^{2+}>K^+ and the anion concentration was ranked as HCO_3^−>Cl^−>SO_4^{2−}>NO_3^−>F^−. When the runoff volume was less than 1000 m^3/s, the runoff was inversely correlated with ion concentration (in addition to K^+ and NO_3^−). When the runoff volume was more than 1000 m^3/s, the ion concentration was not related to the runoff volume. The evaporation of surface water caused the isotopic enrichment of hydrogen and oxygen. The contents of δD and δ^{18}O were raised along the flow direction. Meanwhile, δD and δ^{18}O in surface water of Wuding River formed a larger enrichment in Heihe River. Therefore, it can be concluded that the proposed method can accurately determine the chemical composition of surface water in the Yellow River Basin.

Key words: anion and cation, chemical composition, determination method, Yellow River Basin

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