

Study on an assessment of water quality of the urban rivers in the case of Suzhou, China and Sapporo, Japan

(蘇州 (中国) と札幌 (日本) を例にした都市河川の水質の評価に関する研究)

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Introduction: Suzhou City is a major city located in the southern Jiangsu Province of East China. The old town of Suzhou City, which is the core district of Suzhou City, has a relatively high degree of urbanization and population density. It has one of the most complex canal systems in China. From about 2000, the water quality of canals and rivers in Suzhou City was declining, which has been causing a shortage of necessary water such as drinking water. Some reports have also mentioned the water pollution in the natural lakes or rivers in Suzhou City; however, little attention has been paid to the water quality in urban river systems in this area.

This research assessed the water quality in the old town of Suzhou City to evaluate the situation of the urban river system throughout the year. A WQI method was employed to analyze the seasonal changes of water quality. In order to clarify whether the results obtained in Suzhou City are universally recognized in other cities, Sapporo City, which has artificial rivers in the city, was selected as the second target site. Soseigawa River and Shinkawa River in Sapporo are also artificial urban rivers and have the similar land-use cover of Suzhou City. So the results obtained in two regions were compared to each other.

Methods: A total of 25 sampling sites, 19 in the old town of Suzhou City, China, and 6 sites in Sapporo City, Japan was chosen. In the old town of Suzhou City, water samples from the surface water (10) and the well water (4) of the Pingjiang historic district, and the Suzhou City Moat (5) were collected in August and September, 2019 and in February, 2020. In Sapporo, water samples from the Soseigawa River and Shinkawa River were collected on June, September and November, 2020. The pH, and electrical conductivity were measured by PCS Testr35, Nikko Hansen, COD, NO₂-N, NO₃-N, NH₄-N, PO₄-P, and hardness were measured by Packtest (Kyoritsu chemical-Check Lab) and number *E. coli* in water samples were counted by using papers from Sibata Science Technology. Zn, Cu, Ca, Cd, K and Na concentrations in the water samples were measured with atomic absorbance spectroscopy (Hitachi 120-30).

Results and discussion: The values of pH and heavy metals in all of the water samples were below the standard values in both countries: China and Japan. However, the high concentration of nitrogen and phosphorus was major prominent problem in Suzhou City, the concentrations were higher in summer than those in winter. The number of *E. coli* in summer was also showed markedly high level because of the eutrophication and high temperature. Both calculated WQIs of the Pingjiang historic district and the Suzhou City Moat in summer showed about 50% higher than those in both areas in winter. It was indicated that a significant seasonal changes can be detected. The values of water quality parameters in Sapporo were generally lower than those in Suzhou; however, a similar tendency in seasonal changes was also observed. For these reasons, the water quality in such a city like Suzhou should be assessed in each season. In other words, we must be careful to represent the WQI of one city by the value in any season.