**Species characteristics of nutrients in rivers inflowing to Lake Chaohu: comparison between urban and rural rivers**

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Lake Chaohu is a large, shallow, and eutrophic lake in Eastern China (N31º25′-31º43′, E117º16′-117º5′), with an area of 775 km2. Eutrophication has become to be more and more serious in Chaohu in recent 4 decades, and nutrients input through rivers is recognized as a key cause. There are 11 rivers inflowing to Chaohu, in which 5 rivers flowing through urban, and other 6 rivers flowing through rural area. This study was carried out to compare the species characteristics of phosphorus (P) and nitrogen (N) between the urban and rural rivers.

Water samples were collected in December 2013, April, July, and October 2014 respectively. Sampling sites located 0.5 km upward river mouths. One sediment core was collected at each site in December 2013. Ammonium (NH4+), nitrate (NO3-), nitrite (NO2-), total dissolved N (TDN), soluble reactive P (SRP), and total dissolved P (TDP), total N (TN), and total P (TP) were determined separately. The sum of NH4+, NO3-, and NO2- was dissolved inorganic N (DIN). Dissolved organic N (DON) was calculated as TDN minus DIN, and particle N (PN) was calculated as TN minus TDN. The difference between TDP and SRP was dissolved organic P (DNP), and the difference between TP and TDP is particle P (PP). P fractions in the surface sediments were analysed following a 6-step sequential extraction.

In urban rivers, there were higher TP and P species concentration than the rural rivers. For P species percent in TP, TDP/TP and SRP/TP were increased, while PP/TP, DNP/TDP were decreased in the urban rivers significantly compared to the rural rivers. TN and all N species, except DON, concentration in urban river were increased significantly than the rural rivers. TDN/TN, DIN/TN, and NH4+/TN in the urban rivers was enhanced significantly, while PN/TN and DON/TN was decreased significantly compared to the rural. There was no significant difference between the urban and rural groups on NO3-/TN and NO2-/TN. In the surface sediments, TP in urban rivers were significantly higher than TP in rural rivers. Fe-P and Al-P in urban rivers were separately more than their content in rural rivers. Labile-P, Organic-P, Ca-P, and Residual-P were similar in the two groups. In the urban rivers, Al-P/TP was significantly increased, but HCl-P/TP and Res-P/TP were significantly decreased compared with rural rivers. So, in the urban rivers, there were higher percents of NH4+ and SRP in TN and TP respectively, and urban rivers transfered more NH4+ and SRP into Lake Chaohu. In the 5 rivers, 4 of them located inthe northwest of Lake Chaohu, the large amount input of NH4+ and SRP through urban rivers caused more serious eutrophication in the northwest area than other area in Chaohu.