Tracing sources and migration process of lake sediments by using carbon and nitrogen isotopes-- A case study of Beijing

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Environmental and ecological problems in Beijing lakes have been serious. For this study we collected the surface sediments of 12 lakes and 2 lake sediment profiles in urban Beijing between 2012 and 2013. We analysed the isotopic composition of organic carbon (δ^{13}Corg) and organic nitrogen (δ^{15}Norg) as well as the carbon and nitrogen ratios, total organic carbon (TOC) and total organic nitrogen contents (TON) in order to trace the sources and migration processes of the investigated compounds in the lake sediments. The results show higher contents of carbon and nitrogen in the surface sediments as well as in the sediment cores from lakes in the city centre and in the industrial area compared with lakes from the margin of Beijing. This implies that these lakes have been affected by urban pollution in the highly industrialized areas indicated by a higher level of initial productivity and nutrients, which increases the risk for eutrophication. The differences in productivity, nutrient level and organic matter source among the investigated lakes resulted from their geographical location and urban pollutions. Consequently, the results of this combined geochemical and carbon and nitrogen stable isotope study point to a critical status of the sediments in Beijing lakes, affected by the rapid growth of the city in the past decades.

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