NATURAL AND ANTHROPOGENIC POLLUTANTS IN LAKE SEDIMENTS IN HANOI CITY

TAKESHI HAYASHI[1]*, SATOSHI TAKIZAWA[2], CAU LE NGOC[2], NAOKO WATANABE[2], TOMOCHIKA TOKUNAGA[3]

[1]Faculty of Education and Human Studies, Akita University, Japan, Tegata-gakuen-machi 1-1, Akita city, Akita, 010-8502, Japan
[2]Department of Urban Engineering, Graduate School of Engineering, The University of Tokyo, Japan, Hongo 73-1, Bunkyo ward, Tokyo, 113-8656, Japan
[3]Department of Environment Systems, Graduate School of Frontier Sciences, The University of Tokyo, Japan, Kashiwanoha 5-1-5, Kashiwa city, Chiba, 277-8563, Japan
tokunaga@k.u-tokyo.ac.jp

There are many lakes and ponds that are the remains of paleo river channels of the Red River in Hanoi city. A number of these water areas have decreased with urbanization. According with unplanned reclamations, many water areas have lost surface outflow. On the other hand, untreated waste waters from households flow into these water areas. Also, groundwater that is one of the main resources of water supply in Hanoi city has high concentrations of metallic elements (e.g. Fe, Mn, As) and NH_4. Origin of these metallic elements is considered to be rocks that are distributed in the upstream area of the Red River. Therefore, these water areas have been contaminated by not only natural pollutants but also anthropogenic pollutants. However, it is estimated that the sediments in these water areas absorb, concentrate and decompose a part of pollutants. The objective of this study is to clarify the function of the lake sediments from the view point of solute transport with water cycle. We collected water samples and sediment core samples from the four small lakes that were distributed in suburban areas of Hanoi city and abstracted pore water from the sediments by centrifuge. Chemical components such as major dissolved ions, metallic elements and TOC of pore water and sediments were analyzed. Results of analysis suggested that the sediments absorb and concentrate the most of metallic elements. These lakes were in oligoaerobic condition due to eutrophication that was induced by inflow of untreated waste water. EN.H.E. calculated from the result of ORP of the sediments in these lakes that were composed of silt or clay showed positive value. Also, concentrations of Fe^{2+} in the pore water were very low. Therefore, Fe in the pore water and the sediments was considered to exist as $Fe(OH)_3$ and absorb the metallic elements such as As. On the other hand, concentration of NH_4^+ in the pore water increased with depth. It was estimated that organic substances were decomposed in the sediments. In this presentation, we will show the depth profiles of chemical properties of the pore water and the sediments and discuss about the behavior of pollutants in the sediments.

Keywords: urbanization, pollution, water area