



“Gheorghe Asachi” Technical University of Iasi, Romania



DRY DEPOSITION OF ATMOSPHERIC NITROGEN IN LARGE RESERVOIRS AS DRINKING WATER SOURCES: A CASE STUDY FROM THE DANJIANGKOU RESERVOIR, CHINA

Luo Ling, Zhao Tongqian*, Guo Xiaoming, Zhang Chunxia,
Xiao Chunyan, Wu Li, He Yuxiao

Institute of Resources and Environment, Henan Polytechnic University (HPU), Jiaozuo City 454003, China

Abstract

This paper aims to pioneer the research into the dry nitrogen deposition in reservoirs serving as drinking water sources. For this purpose, several field experiments were performed to investigate the dry deposition in Xiaotaipingyang, Danjiangkou Reservoir (Henan) from September 2015 to August 2017. Sample concentrations were measured for $\text{NH}_4^+\text{-N}$, $\text{NO}_3^-\text{-N}$ and total dry deposition (TDN). Then, dry deposition flux of $\text{NH}_4^+\text{-N}$, $\text{NO}_3^-\text{-N}$ and TDN were estimated based on the measured concentrations and sample volumes. The results show that the TDN at four monitoring sites ranged from 15.2 kg/ha·a to 22.5 kg/ha·a and averaged 19.2 kg/ha·a. The annual dry depositions of $\text{NO}_3^-\text{-N}$, $\text{NH}_4^+\text{-N}$ and dissolved organic nitrogen (DON) were respectively 5.7 kg/ha·a, 8.6 kg/ha·a and 5.0 kg/ha·a, indicating that reduced nitrogen dominates the dry deposition and the DON is a non-negligible compound of the TDN. Moreover, seasonal nitrogen dry deposition was ranked in the order of summer, autumn, spring, and winter. Dry deposition mainly occurred from April to September (>75% of TDN), which is consistent with the temperature change and the fertilizing time in local agriculture. These results illustrate the occurrence of nitrogen pollutants input from the atmosphere into Danjiangkou Reservoir (Henan), which may represent a considerable proportion of the total nutrient loading to the reservoir. The research results shed new light on the protection of reservoirs serving as drinking water sources from the dry deposition.

Key words: dry deposition, nitrogen, drinking water source, Danjiangkou Reservoir, variation

Received: April, 2018; Revised final: July, 2018; Accepted: September, 2018; Published in final edited form: September, 2018

* Author to whom all correspondence should be addressed: e-mail: zhaotq@hpu.edu.cn; Phone: +86 3913986468; Fax: +86 3913987881