Occurrence of *N*-nitrosamines in surface water and groundwater in South China

YINGJIE CHEN[12], WENWEN CHEN[3], JIE LI[4], SHIHUA QI[12]*

[1]School of Environmental Studies, China University of Geosciences, Wuhan 430078, China (cyj@cug.edu.cn)
[2]State Key Laboratory of Biogeology and Environmental Geology, China University of Geosciences, Wuhan 430074, China (*correspondence:shihuaqi@cug.edu.cn)
[3]College of Environmental Science and Engineering, Guilin University of Technology, Guilin 541004, China (chenwenwen88@outlook.com)
[4]Office of Science and Technology Development, China University of Geosciences, Wuhan 430078, China (kyc02@cug.edu.cn)

This is the first large-scale, systematic assessment of *N*-nitrosamines occurrence in groundwater and corresponding surface water across South China. Samples collected from 68 shallow wells and 62 surface water samples were selected for 8 kinds of *N*-nitrosamines analysis. Within them, 32 sampling wells are pumped as drinking-water supply. We observed that *N*-nitrosamines were widespread in both groundwater and surface water, including *N*-nitrosodiethylamine (NDEA), *N*-nitrosomorpholine (NMOR) and *N*-nitrosodi-n-butylamine (NDBA), with the detection frequency higher than 60%. *N*-nitrosodimethylamine (NDMA) and *N*-nitrosopyrrolidine (NPYR) were also detected in more than 15% of sampling sites. Furthermore, there is no significant difference of *N*-nitrosamines occurrence between groundwater and surface water. In addition, we observed significant positive correlations of each detected *N*-nitrosamine ($r^2 > 0.440$, $p < 0.01$) between groundwater and surface water. Detection frequency is highest in industrial zone, followed by mixed land use. Higher concentrations and detection frequencies were also observed mainly in private well, which are used as drinking-water for people. Our results indicate that groundwater used for drinking water in South China is generally contaminated by these compounds, and exposure to them is likely to impact the health of water consumers.