



## **Assessment of organic pollutants and their toxicity in Tai Lake, China – Implications for drinking water production**

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Taihu (Tai Lake) is China's third largest freshwater lake and serves as drinking water resources for several million people. Located in a densely populated region close to Shanghai, Taihu is a drastic example of water pollution. Organic contaminants, heavy metals and the excess of nutrients from urban areas, industry and agricultural run-off not only pose a risk for the environment but also endanger a safe drinking water quality. Therefore, the Sino-German SIGN project aims to adapt proven technologies and management concepts from Germany to the conditions in China in order to improve lake management and guarantee a long-term safe drinking water supply.

This study presents and discusses the results of the first project (2015-2018) with respect to occurrences of organic pollutants, their toxicity and impact on drinking water. Moreover, it presents first results of the second project (2018-2021) focusing on organic contamination of sediment as potential source of raw water pollution and on elimination rates of 200 organic contaminants during different treatment steps in drinking water plants.

During the first project, multiple sampling campaigns in the Northern Taihu, artificial wetlands, drinking water and wastewater treatment plants have been conducted. More than 80 samples have been collected and analysed for pesticides, industrial chemicals, pharmaceuticals, PAHs, VOCs and THMs. Here, 70 different organic pollutants have been detected, whereas spatial patterns indicate multiple sources within the various catchment areas of the major inflowing rivers. The results further show that the artificial wetlands, which are used as pollution control for water fluxes entering Taihu, are able to substantially lower pollution loads. Also, several pollutants have been detected in the drinking water.

In order to evaluate mixture effects regarding endocrine disruption and genotoxicity, *in vitro* bioassays have been conducted. Estrogenic activity up to 2.1 ng EEQ / L could be determined in 18 samples while no androgenic effect and no genotoxic potential were observed. Furthermore, a potential environmental and human risk was assessed, identifying spatial and temporal exceedances of 19 parameters like the analgetic Ibuprofen, the herbicide Bentazone and the x-ray contrast agent Iohexol.

Based on the results of the study, several recommendations for drinking water treatment facilities have been derived. For example, the dosage of ozone for water purification should be adjusted according to online measured physico-chemical parameters in order to avoid the generation of transformation products.