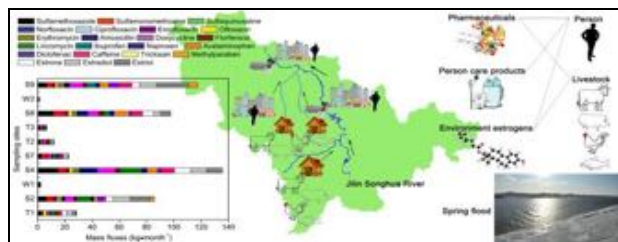


## Contaminants of Emerging Concern in a Freeze-Thaw River During the Spring Flood

, DEMING DONG\*, ZHIYONG GUO, SINAN HE, XIUYI HUA

College of New Energy and Environment, Jilin University,  
Changchun 130012, China (\*correspondence:  
dmdong@jlu.edu.cn)

Pharmaceuticals, personal care products, and environment estrogens, as contaminants of emerging concern (CECs), have been widely detected in aquatic environments around the world. However, surveys of seasonal freeze-thaw rivers with special hydrological features are limited. To address this, in this study the occurrence, distribution, ecological risk, and mass flux of 22 CECs in the Jilin Songhua River in northeast China, a famously seasonal freeze-thaw river at mid- and high-latitude regions, were investigated during its spring flood period. The results indicate that estriol had a maximum concentration of 27.4 ng·L<sup>-1</sup> in the mainstream river water. Doxycycline had a maximum concentration of 204.4 ng·L<sup>-1</sup> in the tributary river water and 103.0 ng·L<sup>-1</sup> in the riverine wastewater treatment plant (WWTP) effluents. The mean concentrations of the targeted CECs in the spring flood were 1.4 times higher than those found in our previous investigation during the summer flood. A risk assessment showed that estrone posed a high risk in the mainstream, doxycycline posed a high risk in the tributaries, and ofloxacin posed a high risk in the riverine WWTP effluents. In addition, erythromycin and lincomycin posed a medium to high risk in the river water and WWTP effluents. The major contribution of the CECs in the mainstream came from its tributaries, which contributed a total of more than 50% in the spring flood period. The results suggest that some appropriate measures should be taken to reduce the contribution of the CECs from the tributaries to the seasonal freeze-thaw river in its spring flood period.



**Figure 1:** Survey region and seasonal mass fluxes.