Warming and nutrient regime reorganize phytoplankton communities under low-silicate conditions

S1 Environmental context of the study area

The spring and summer surveys revealed distinct seasonal differences in the environmental conditions of the thermal-discharge area (Figure S1). In spring, surface-water temperature ranged from 10.8 to 18.8 °C, with a mean of 12.4 °C, whereas summer temperature ranged from 24.0 to 33.0 °C, with a mean of 25.7 °C. Spring waters also contained higher DIN (2.34–13.30 μmol·L^{-1}; mean 5.18 μmol·L^{-1}) but lower DIP (0–0.43 μmol·L^{-1}; mean 0.052 μmol·L^{-1}) and DSi (0–1.65 μmol·L^{-1}; mean 0.71 μmol·L^{-1}) than summer waters, in which mean DIN, DIP, and DSi were 2.57, 0.129, and 4.26 μmol·L^{-1}, respectively.

The spring DIN:DIP ratio averaged 126.1 ± 106.4, and the Si:DIN ratio averaged 0.135 ± 0.06. By comparison, the corresponding summer means were 19.9 ± 10.1 and 2.27 ± 2.20. Thus, the spring survey was characterized by relatively high DIN and low DIP and DSi, providing an environmental context of potentially strong phosphorus and silicon limitation. In summer, the higher DIP and DSi concentrations and lower DIN:DIP and higher Si:DIN ratios indicated substantially greater availability of phosphorus and silicon..

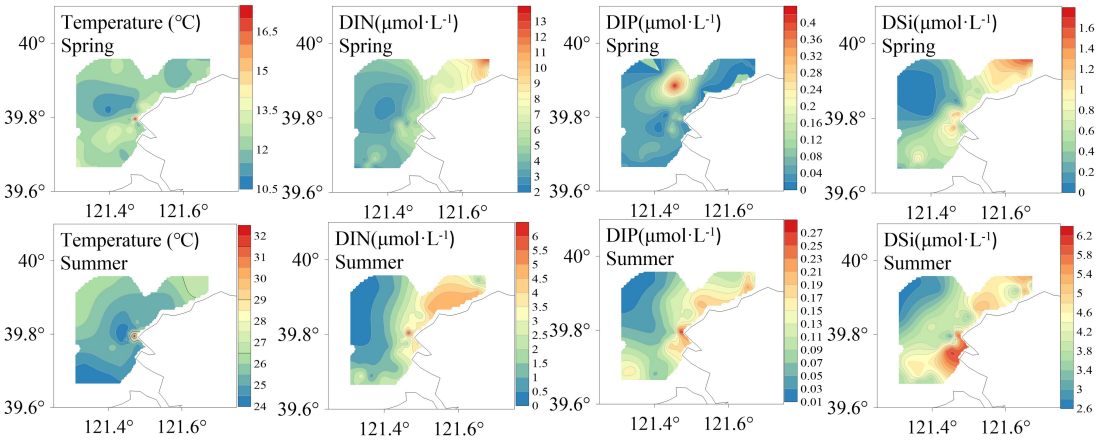


Figure S1 Spatial distributions of surface-water temperature, dissolved inorganic nitrogen (DIN), dissolved inorganic phosphate (DIP), and dissolved silicate (DSi) in the study area during spring and summer 2025.