

## **Influence of ecosystem on hydrochemistry and stable isotope of surface and groundwaters in the Yellow River Delta**

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**Abstract** To determine the influence of the increased amount of transferred water on groundwater quality in the Yellow River Delta, 12 ground- and 11 surface-water samples derived from three ecosystems were collected for major ions (Na, K, Mg, Ca, NO<sub>3</sub>, SO<sub>4</sub>, Br, Cl, HCO<sub>3</sub>) and stable isotope analysis (<sup>2</sup>H/<sup>18</sup>O). The land-use changes along the mainland towards the Bohai Sea from farmland to wetland to the coast. The hydrochemical compositions are most complicated in the farmland and wetland groundwater, indicating the mixing process with water transferred from the Yellow River, whereas the ones on the coast are dominated by NaCl. The ratios of <sup>2</sup>H/<sup>18</sup>O in farmland and wetland groundwater are plotted on or close to the local meteoric water line (LMWL), and ones from the coast are enriched in both <sup>2</sup>H and <sup>18</sup>O (the seawater). The NO<sub>3</sub> positively corresponds with Cl in the farmland and wetland, with 40% of groundwater samples exceeding the allowable nitrate drinking water level (10 mg/L). Therefore, it is inferred that irrigation water from the Yellow River and anthropogenic pollution are two nitrogen sources of nitrate.

**Key words** Yellow River Delta; ecosystems; irrigation water; hydrochemistry; stable isotope