

Groundwater trace metal pollution and health risk assessment in agricultural areas

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Abstract Irrigation projects have diverted water from the lower reaches of the Yellow River for more than 50 years in China. This study was conducted to quantify the hydrochemical and trace metal characteristics, map the spatial distribution of the health risk caused by trace metals, and identify the origin of trace metals in groundwater in the north part of Henan-Liaocheng Irrigation Area (HLIA). Results show that the mean value of the sum of hazard quotients (Σ HQs) exceeded the generally acceptable risk level recommended by the US EPA. The maximum Σ HQs was 3.79 for the local residents, and the spatial distribution of Σ HQs did not show a significant trend in relation to distance perpendicular to the Yellow River. Primary sources of Fe, Se, Zn, Ba and Mn were associated with geogenic origin; B, Mo Sr, and V were from industrial and agrochemical processes.

Key words trace metal; hazard quotients (HQs); groundwater; spatial distribution; origin; Yellow River