

Sedimentological controls on the formation of high arsenic aquifers in central Yangtze River Basin

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Understanding the mechanism of geogenic arsenic mobilization from sediments to groundwater is important for safe and sustainable drinking water supply and water quality management in the central Yangtze River Basin. Bulk sediment geochemistry, arsenic associated mineralogical analysis and high-resolution OSL dating have been applied to decipher the sedimentological controls on the formation of high arsenic aquifers within the Late Pleistocene-Holocene deposits.

Sedimentological processes and palaeoclimatic optima after the Last Glacial Maximum (LGM) have created favorable conditions for the formation of high-As aquifer systems. Bulk sediment geochemistry results indicated that As correlated with sulfur in the pre-LGM sediments and by contrast As correlated with iron in the post-LGM sediments. Iron sequential extraction and SEM-EDS analysis results indicated Fe mainly existed as iron-oxides in Holocene and upper Pleistocene sediments, while the siderite and pyrite were the main form of in middle-lower Pleistocene sediments.

The intense chemical weathering leading to sulfur depletion after the LGM could facilitate As enrichment in the Holocene and upper Pleistocene aquifer. Arsenic release depends on the iron mineralogy and microbial community in the aquifer sediments.

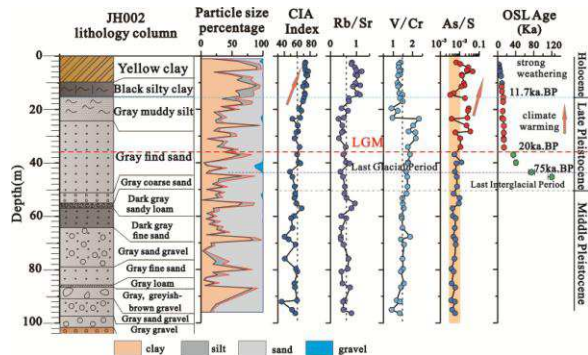


Figure 1. The variation of particle size, CIA index and mole ratio of As/S in sediment samples of JH002 borehole.