

## **Environmental assessment using multiple stable isotopes and heavy metals in a Chinese coal mining area**

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In order to assess the magnitude of anthropogenic perturbations, and to identify the degree, sources, and pathways of contamination, a comprehensive geochemical and isotopic investigation was performed on coal, soil as well as water collected over a wide area in the Huainan coalfield, Anhui Province, China. Heavy metal pollution in Huainan coal mine and its surrounding surface soil and drinking water is diverse and serious. In many cases, Cd and As concentrations in soil are higher than the national guideline limits for soil environment quality. Half of samples' Fe concentration and most of samples' Mn concentration in drinking water samples show higher than the national guideline limits. 10% of the samples reveal concentrations above the official threshold value for As, which makes this drinking water unsuitable for daily consumption, due to a serious health risk. The  $\delta^{15}\text{N}$  and  $\delta^{18}\text{O}$  values of nitrate from drinking water show that nitrates are mainly from manure, septic waste and soil; the  $\delta^{15}\text{N}$  and  $\delta^{18}\text{O}$  values of nitrate from river water disclose that nitrates are mainly from soil, manure and septic waste. Hence, the results of this study point to a critical status caused by the coal mining and combined with anthropogenic pollution from urban and countryside effluents.

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