

Temporal variation of nitrogen in the groundwater under the influence of seasonal hydrologic change in typical area of the Jiangnan Plain

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Introduction and Methods

The pollution of nitrogen in groundwater is extremely serious in the eastern of Jiangnan plain, which is characterized by significant change of seasonal hydrologic condition. To characterize temporal variation of nitrogen in the groundwater under the influence of seasonal hydrologic change, groundwater samples with different depth(10m, 25m) in different seasons were collected to analyze the nitrogen speciation coupled with supporting chemistry in a typical field site.

Discussion of Results

During the monsoon season, groundwater level increased, coupled with low Eh and DO, enhancing the reducing potential of aquifer media. As a result, NO₃-N was not liable to be produced and was more likely to be consumed by denitrification. Moreover, with the mineralization enhanced, NH₃-N was gradually becoming the main speciation of dissolved inorganic nitrogen.

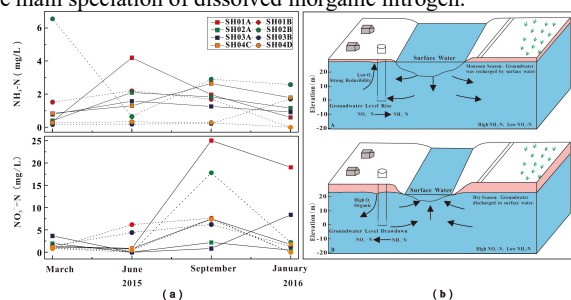


Figure 1: Seasonal variation and conceptual model of nitrogen concentration in groundwater (a: Seasonal variation of nitrogen concentration; b: conceptual model of the transfer and transformation among nitrogen).

After the monsoon season, groundwater level declined, coupled with elevated Eh and DO, enhancing the oxidizing potential of aquifer media. As a result, nitrification was enhanced and denitrification was limited, making the concentration of NO₃⁻-N increased(Fig.1). In summary, under the coupled influence of natural and anthropogenic factors, seasonal hydrologic change resulted in the variation of redox potential, which was the main trigger for seasonal variation of nitrogen concentration and speciation in the groundwater.