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The rational development and exploitation of groundwater in the Hutuo-river alluvial fan in the North China Plain

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Abstract

The Hutuo-River alluvial fan is a typical piedmont hydrogeological units, groundwater is the main water supply in this area. Due to the large exploitation in the recent 50years, the groundwater level continued to decline more than 30m, and the groundwater storage continuously reduced. It has seriously threatened the water supply security.

In this work, we studied the groundwater recovery effects under the condition of reduced-exploitation during Water supply of the South to North Water Transfer, proposing sustainable development and utilization of groundwater strategy. For the first time, we established a 10years' (ranged from 2002 to 2013) groundwater numerical modeling, also proved the groundwater regulation water and the limited regulated groundwater level. The regulation reservoir was calculated to be around $7 \times 10^8 \text{m}^3$. Combined with the strategy of South to North water transfer, we proposed plans such as the reduced urban groundwater exploitation, groundwater exploitation in agriculture under various water saving irrigation conditions. The model clearly showed the groundwater recovery effects. Further we proposed the sustainable development and utilization of groundwater.

Key words: Hutuo-river alluvial fan; groundwater modeling; South to North water transfer; groundwater regulation

