

## Interaction between Surface water and Groundwater in Baiyangdian Lake Watershed, North China Plain

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The people in North China Plain are mainly using groundwater as a major water resource. Because of an excessive pumping due to a rapid industrialization and expansion of the irrigated field, groundwater table drawdown and the water quality deteriorated recently in the North China Plain. On the other hand, as progress of scientific researches about the hydrology and the water resources, it has been clear that a development of either surface water or groundwater has affected on the quantity and the quality of the other. Therefore, it is urgently necessary to improve an understanding of the characteristic of the water quality and the groundwater processes in the North China Plain for sustainable water use.

The purpose of this study is to investigate the characteristics of the water quality and the groundwater flow process in Baiyangdian Lake watershed, the North China Plain. The field survey and the water sampling of the groundwater, the river water and the lake water were performed in June, 2011. Inorganic constituents and stable isotopic composition of deuterium and oxygen were determined on every water sample. The results of the study are as follows.

The water of Tang reservoir has a characteristic ion composition and the water of Baiyangdian has a distinctive isotopic composition and also water quality of Fu river is characterized high concentration of nitrate. So, each of surface water is affected by different process of water quality formation.  $\text{Na}^+$ ,  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$  concentrations and  $\delta^{18}\text{O}$  distributions in groundwater suggest that <sup>1)</sup> groundwater around Tang reservoir is recharged from Tang reservoir and flow in the direction of Northeast, <sup>2)</sup> groundwater around Baiyangdian is recharged from Baiyangdian which is influenced by high evaporation, <sup>3)</sup> in the region of Fu river, influence of interaction between surface water and groundwater is lighter than that of Tang or Baiyangdian region. Concentration of  $\text{NO}_3^-$  in deep groundwater indicate the intrusion of this contaminant from shallow to deep aquifers with downward groundwater flow, but in this study, we have few data of deep groundwater. To understand accurate mechanism of interaction between shallow groundwater and deep groundwater, we need more fruitful data.

Keywords: North China Plain, recharge of groundwater, water quality formation, stable isotope, cluster analysis