

## Hydrological and Chemical Assessment of Groundwater Flow and Quality in Costal Brine Aquifers of Laizhou Bay, China

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In geological time, seawater had been intruded groundwater several times since Late Pleistocene in the coastal area of Laizhou Bay, China. This unique phenomenon caused freshwater and brine water interbedded each other in the aquifers and forged Laizhou Bay became a multiple sources dynamic coastal area. In the last two decades, massive exploitation of fresh groundwater and brine water has significantly increased seawater intrusion and strengthened mixture of brine water and freshwater in the coastal area, which threatens local groundwater resources and severely impacts local ecological geo-environment. In this study, the hydrological and chemical (HC) process was studied according to the monitoring wells and chemical ionic constituents. The groundwater level continuously decreasing rather than showing a typical seasonal variation in areas close to the depression cone. A groundwater divide was formed along Yingli-Houzhen-Yangzi accounted for the exploitation of fresh water in the south and brine extraction in the north. This divide prevented the saltwater intrusion to fresh groundwater further south in study area. The results also showed that during concentration process, a series of complex reactions including water chemistry, metamorphic role and evolution took place, such as mineral precipitation, cation ion exchange, dedolomitization and silicate alteration, etc. This work highlighted hydrological-chemical coupling process and provided a better insight into hydrogeological system.