Abstract: Karst water is one of the most important water sources in Central Southern Shandong Province, China (Liang Yongping and Wang Weitai, 2010; Liu Guangya, 2017). The boundaries of karst water administration area are mainly administrative boundaries, geomorphic unit boundaries or surface rivers, conjointly surrounding some small open karst water system, which covers several hundred square kilometers, and lateral runoff taking place between karst water in the region and that outside the region (He Keqiang et al., 2002; Han Xingrui, 2015). In this passage, we selected the Pingyi-Feixian karstwater systems a typical study area, in an attempt to discuss the hydrogeological characteristics of karst water in the area of 596 km², based on water management, where the main understanding and innovative conclusions have been achieved as follows: (1) there are four main types of around and bottom boundaries, including the planes of unconformity between

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Fig. 1. Conceptual model of Pingyi-Feixian karst water in Central Southern Shandong Province.

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intrusive metamorphic rocks and cambrian carbonate rocks (B1), water-resistant fault structure (B2), surface watershed (B3) and surface river (B4). Which B1, B2 and B3 are all zero flux boundaries of karst water, and lateral runoff flow pass B4; (2) the karst water system has been characterized by a “hard structure” with “double-zone and double-source recharge, multi-layer water storage, and complex water control with multiple faults”, where the exposed area of carbonate rocks has been direct recharge area, while the exposed area of intrusive metamorphic rocks is an indirect recharge area. Precipitation infiltration and river seepage are two sources of recharge. The carbonate strata of the Middle Cambrian to Middle Ordovician are the main karst water reservoirs, and clustering distribution characteristics of the aquifers. Tongshi Fault (F7) is the main water-proof fault in the north-south direction and run through the study area, there are also some sporadic and small-scale water-proof faults (F1, F8), whereas most of the faults in the area have good permeability; and (3) There has been unique conceptual model of karst water flow, including 4 modes of recharge: direct infiltration recharge of precipitation, leaching infiltration recharge of meteoric precipitation through the quaternary overburden, concentrated recharge of river leakage, and indirect recharge of precipitation in the distribution area of intrusive metamorphic rocks, also there are 2 kinds of runoff modes, which including Pingyimoniocene tectonic karst fissure water runoff in Ordovician and Feixian monoline tectonic karst fissure water runoff in Cambrian-Ordovician. Furthermore, artificial concentrated exploitation of middle and deep karst water has been the main discharge mode. As shown in Fig. 1, the conclusion of this study has theoretical value for the study of small open karst water system in northern China, and can also guide the development and control of karst water.

**Keywords:** open karst water system, boundaries, hard structure, conceptual model of water flow

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