Surfacewater-groundwater interaction in the Heihe River basin, Northwestern China

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Abstract

River discharge and groundwater level data were collected in the Heihe River basin, which is the second largest inland river in Northwestern China. The surfacewater-groundwater interaction, particularly in the lower desert reaches, was analyzed with the help of isotope data of water collected from the river. In the non-irrigation period, river water, which originated from the groundwater in the middle oasis reaches, was present throughout the period in the lower desert reaches. During this period, the river water recharged the groundwater not only in the riparian forest region located near the river but also in the desert-riparian fringe region located farther away from the river. In the irrigation period, the river was usually dried up in the lower desert reaches. The river water in the lower reaches appeared just after short-term releases from the middle reaches; the groundwater level in the riparian forest region rose rapidly, but it declined again just after the short-term releases finished. Since the mixing ratio of the short-term released discharge to the groundwater in the desert-riparian fringe region was smaller than that in the riparian forest region, the short-term released discharge did not contribute to the groundwater recharge in the desert-riparian fringe region.