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Analysis on the facts of runoff increase in the Urumqi River basin, China

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Abstract This paper systematically analyses the runoff changes at three stations in the headwater, middle and low basins of the Urumqi River in the Tianshan Mountains of China during 1958–2003. The runoff in the Urumqi River basin has shown a remarkable positive trend during the past several decades, responding to the climatic change in Xinjiang regions, particularly since the mid 1980s. All runoff of three hydrological stations, Glacier No. 1 at the Urumqi River headwater (hereafter Glacier No. 1 hydrological station), the Yuejinqiao in the middle basin (hereafter YJQ) and Yingxiongqiao in the low basin (hereafter YXQ), increase strongly, although the timing of runoff increases were not concurrent among the stations. Furthermore, the records show that an abrupt increase in runoff at the Glacier No. 1 hydrological station occurred in 1997, which was probably caused by both the rapid ablation of glaciers in response to the intense climate warming processes and the precipitation increase in the basin. Results also show that the trends of annual runoff at the YJQ are consistent with that at Glacier No. 1. Preliminary analysis indicates that the runoff increase in the Urumqi River basin mostly resulted from the significant precipitation increase in the high altitude mountain regions.

Key words climatic transition; precipitation; runoff; Tianshan mountains; Urumqi River