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Spatio-temporal variability of meteorological and hydrologic droughts in typical closed glacial basin

Z. Li, J. Li, Z. Hao, and S. Chen

State Key Laboratory of Hydrology-Water Resources and Hydraulic Engineering, Hohai Univ., Nanjing, China (lizh_hhu@live.com)

An analysis of meteorological droughts from March 1961 to Feburary 2001 in Tarim Basin by using Reconnaissance Drought Index (RDI) incorporating potential evapotranspiration is presented, while hydrological droughts within the source region of Tarim River were also recognized based on Streamflow Drought Index (SDI). To assess spatio-temporal variability of meteorological droughts, a principal component analysis (PCA) were applied to the RDI series, four well-defined parts with different temporal evolution of droughts were identified (north, south, west and east parts of Tarim Basin). With a focus on the north and south part, where three most important headstreams including Aksu River, Yarkant River and Hotan River were distributed, the relationship between meteorological and hydrolgical droughts was investigated in multiple timescales (1,3,6,12 months) comparison between SDI series and the corresponding RDI principal components through the Fast Fourier Transform algorithm (FFT).
This study aims to reveal complexities of hydrologic cycle over this closed basin where glacier melting plays a very active role and how the meteorological and hydrological droughts affect each other under regional climate change.