IWRM2018-38
8th International Water Resources Management Conference of ICWRS

Dynamic spatiotemporal change of the precipitation in Pearl River Basin from 1960 to 2016

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Abstract: Dynamic spatiotemporal change of the precipitation (P) research is an important base for basin water cycle research. This study intends to find the characteristic of the dynamic spatiotemporal change of P in Pearl River Basin based on the daily P data in 54 meteorological stations. Firstly, MK statistical tests and trend methods are used to test the temporal change of the precipitation. Secondly, after compared different interpolation methods, we used kriging ordinary with spherical variogram in the ArcGIS to get the P spatial distribution in monthly and yearly scale. Thirdly, we calculated the change trend of each pixel in monthly and yearly scale. The results show that (1) Annual P is about 1496.10mm, the lowest in 1963 is about 1113.45mm, and highest in 1997 is about 1814.34mm. Season P has obvious change, the value of spring, summer, autumn and winter are 29.28%, 46.42%, 16.57% and 7.73% of the yearly P. (2) P spatial distribution showed a decreasing trend from east to west, Pearl River Delta had the highest about 2087.66mm, Yuxi and Mengzi region had the lowest P about 880.40mm. Monthly, P decreased from east to west in each month from January to June, and highest distribute region moved from the northeast to south and west. Pearl River Delta had the highest P distribution from July to September, and highest value moved to the west region in October, then moved to the east region. (3) The spatial variation of different time scales is obvious. In the view of interannually change, Rongjiang, Duan and Bincheng zone mainly showed an increasing trend, and the west region showed a decreasing trend. Guangzhou, Zengcheng and Zhongshan areas have the highest increasing rate in pixel scale about 6.69mm, Zhanyi, Luxi, Panxian and Shuicheng have the largest reduction about 4.44mm. In month changes, February, April, July to October showed downward trends; on the absolute change of the whole basin, the highest change value in August is about 0.83mm, followed by June, April, October and January were 0.72mm, 0.54mm, 0.47mm and 0.40mm, respectively.