



地理学报(英文版) 2005年第15卷第2期

Observed climatic changes in Shanghai during 1873-2002

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Variation characteristics of temperature and precipitation in January and July and annual mean temperature and annual precipitation are analyzed with the help of cumulative anomalies, Mann-Kendall analysis and wavelet analysis. The research results indicate that January precipitation presents an increasing trend after 1990, wavelet analysis result suggests that this increasing trend will continue in the near future. The changes of July precipitation present different features. During 1900-1960, July precipitation is in a rising trend, but is in a declining trend after 1960. Wavelet analysis shows that this declining trend will go on in the near future. Temperature variations in Shanghai are in fluctuations with 2 to 3 temperature rising periods. Mann-Kendall analysis indicates that temperature variations have the obvious abrupt change time when compared with precipitation changes in Shanghai during the past 100 years. The abrupt change time of January temperature lies in 1985, and that of July temperature lies in 1931-1933 and annual mean temperature has the abrupt change time in 1923-1930. Except July precipitation, the precipitation in January, temperature in January, July and annual mean temperature, and annual precipitation are also in a rising trend in the near future. The research results in this paper may be meaningful for future further climatic changes of Shanghai and social mitigation of climatic disasters in the future.

Paper (PDF)

关键词: Shanghai; climatic change; wavelet analysis; Mann-Kendall analysis doi: 10.1360/gso50210