

Estimation of the Influence of Meteorological Factors on the Potential Evapotranspiration of Yanhe River Basin

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Abstract

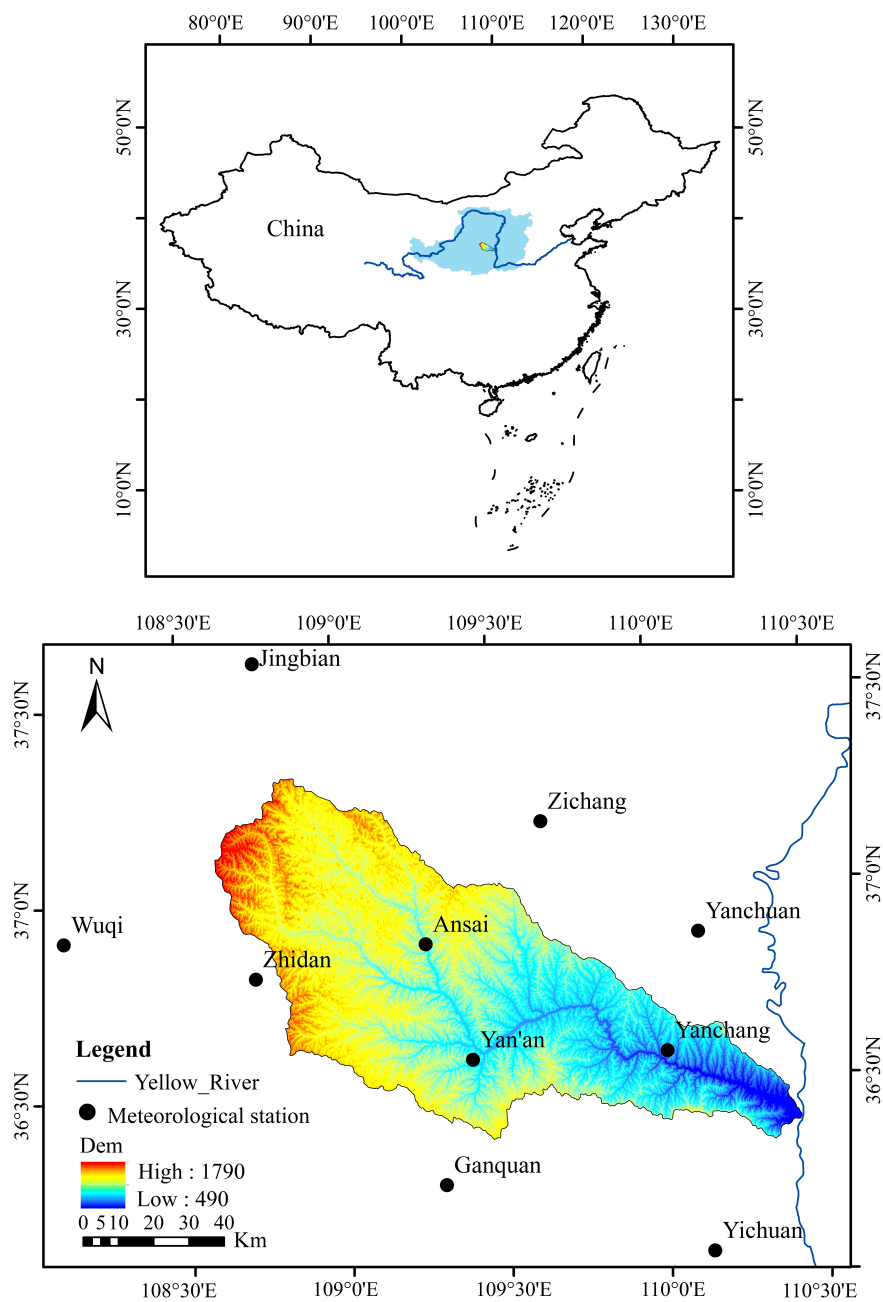
Potential evapotranspiration (ET_0) is an important expenditure item in the hydrological cycle. Quantitative estimation of the influence of meteorological factors on ET_0 can provide a scientific basis for the study of the impact mechanism of climate change on the hydrological cycle. In this paper, the Penman-Monteith method was used to calculate ET_0 . The Mann-Kendall statistical test and the Inverse Distance Weighting method were used to analyze the temporal and spatial characteristics of the sensitivity coefficient of ET_0 to meteorological factors and contribution rate of meteorological factors to ET_0 . And the reasons for the change of ET_0 were quantitatively explored in combination with the change trend of meteorological factors. The results showed that the average ET_0 in the Yanhe River Basin from 1978 to 2017 was 935.92mm. Except for Ganquan Station, ET_0 showed an upward trend. Generally, the sensitivity coefficient of air temperature (0.08), wind speed (0.19) and solar radiation (0.42) was positive and the sensitivity coefficient of relative humidity (-0.41) was negative. But there were significant temporal and spatial differences. The upward trend of air temperature and solar radiation contributed 1.09% and 0.55% to ET_0 . Respectively, the downward trend of wind speed contributed -0.63% And the downward trend of relative humidity contributed to -0.85% of ET_0 . Therefore, the decrease of relative humidity did not cause the increase of ET_0 in Yanhe River basin. The dominant factor of the upward trend of ET_0 was air temperature. But the dominant factors of ET_0 had significant temporal and spatial differences. The downward trend of wind speed at Ganquan Station contributed -9.16% to ET_0 , which indicated the dominant factor of “evaporation paradox” in Ganquan area was wind speed. Generally, the increase of ET_0 was related to air temperature, wind speed and solar radiation. And the decrease of ET_0 was related to relative humidity.

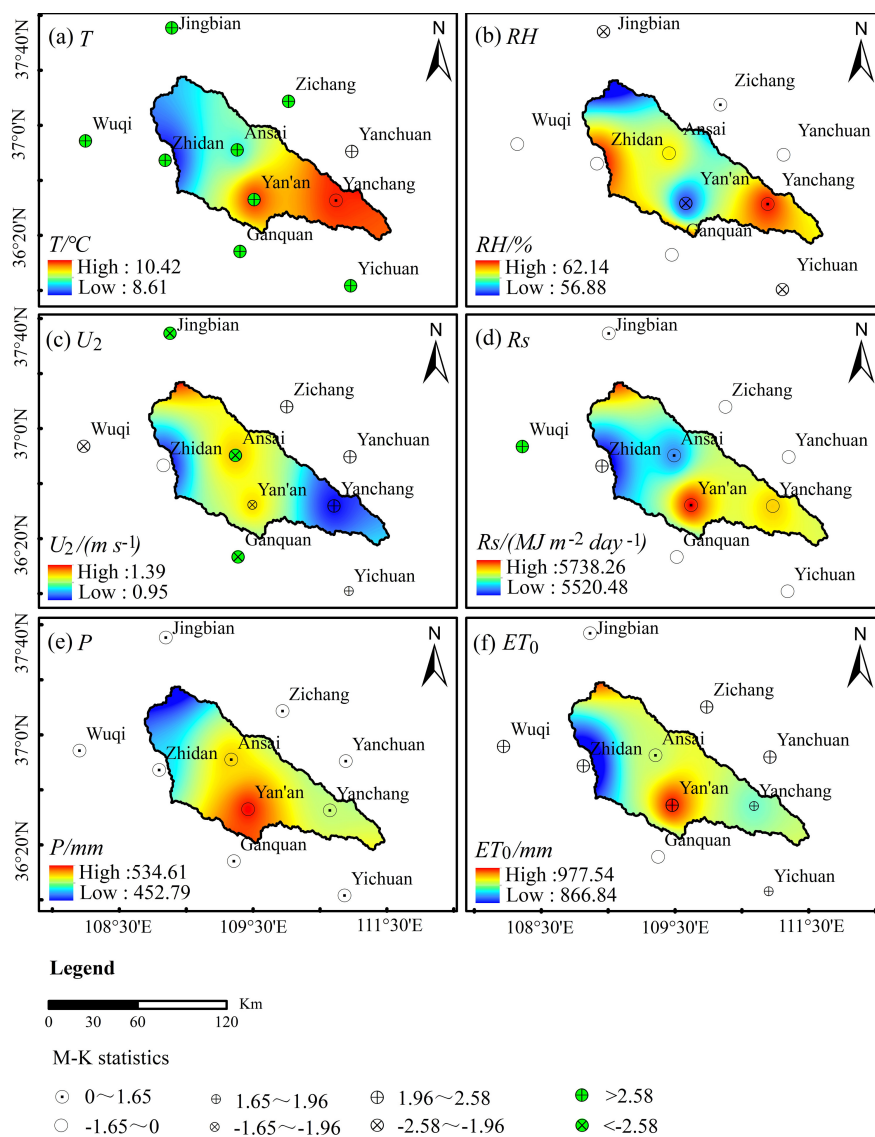
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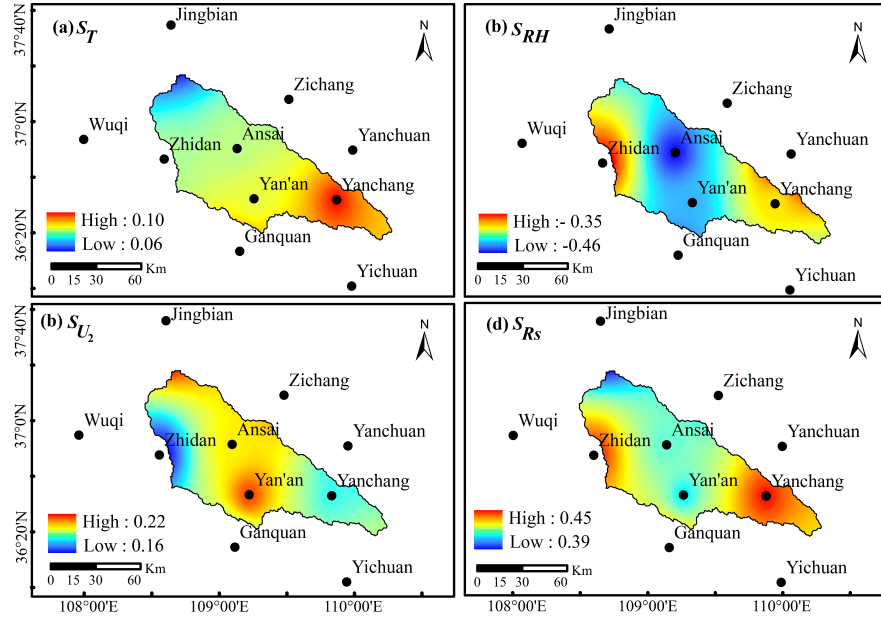
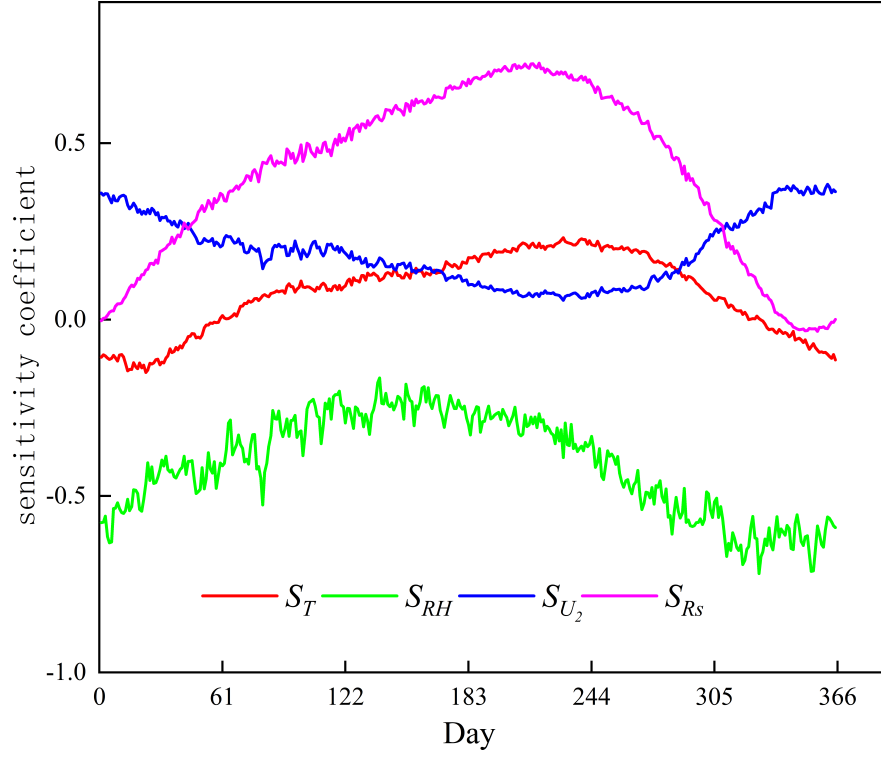
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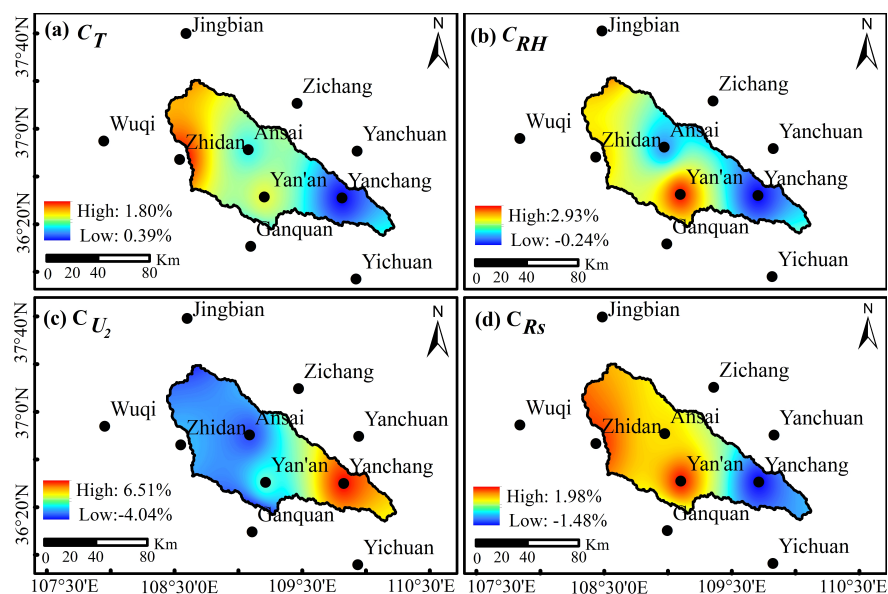
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