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玛纳斯河流域ET0影响因子分析及对Hargreaves法的修正

Influencing factors analysis of reference crop evapotranspiration and modification of Hargreaves method in Manas river basin

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中文摘要:

准确估算作物蒸发蒸腾量对于农业水资源的规划和指导农田灌溉非常重要。该文以具有典型内陆河特征的玛纳斯河流域为例,根据1953—2008年的气象资料,采用Penman-Monteith (PM)法计算了流域内参考作物蒸发蒸腾量,并对影响参考作物蒸发蒸腾量的各气象因子进行了通径分析,结果表明在玛纳斯河流域温度是影响参考作物蒸发蒸腾量的最主要因子。以PM法计算得到的参考作物蒸发蒸腾量为标准值,对Hargreaves法计算的参考作物蒸发蒸腾量进行比较分析,结果表明Hargreaves法计算结果偏差较大,在4—10月尤为明显。基于35 a气象资料,采用贝叶斯方法对Hargreaves公式进行修订,采用另外21 a气象资料对修订的Hargreaves公式进行验证,结果显示修正后的Hargreaves公式满足精度要求,且计算简便,可为内陆河流域参考作物蒸发蒸腾量的计算提供参考。

英文摘要:

Accurate estimation of reference crop evapotranspiration(ET0) is essential to water resources planning and farm irrigation scheduling. Based on the meteorological data from 1953 to 2008, ET0 in Manas river basin (a typical inland river in Xinjiang province) was calculated by Penman-Monteith method (PM), and the meteorological factors affecting ET0 was analyzed by the path analysis. The results showed that temperature was the main factor affecting ET0. Assuming the ET0 calculated by PM as the standard value, values of monthly ET0 calculated by Hargreaves method were higher, especially from April to October per year. Based on meteorological data of 35 years, the Hargreaves method was modified by the Bayesian method, and was validated with the meteorological data of the other time series of 21 years. Results indicated that the accuracy of the modified Hargreaves method in calculating ET0 was greatly improved. The modified Hargreaves method that is simpler than PM method can be used to calculate ET0 in other inland river areas.

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