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青海省东部高原农业区参考作物蒸散量的时空变化

Temporal-spatial variations of reference crop evapotranspiration in eastern plateau agricultural region of Qinghai province

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中文摘要:

为了确定变化环境下青海省东部高原农业区合理的作物灌溉制度,对参考作物蒸散量进行了时空变化分析。采用Penman-Monteith公式以及12个气象站的气象资料计算了青海省东部农业区1960—2006年参考作物蒸散量,用Mann-Kendall检验、Morlet小波分析、以及GIS的空间分析功能,分析了参考作物蒸散量的时间、空间变化特征。结果表明:从时间尺度上看,研究区平均参考作物蒸散量随时间呈显著的下降趋势,突变的时间约为1974年,主周期为25 a左右,在这个时间尺度上参考作物蒸散量表现为多→少→多3个循环交替的过程。从空间尺度上看,参考作物蒸散量南高北低,东高西低,在东南-西北方向上递减,具有明显的地区差异,夏季参考作物蒸散量分布在很大程度上影响了全年参考作物蒸散量的分布特征。影响参考作物蒸散量的主要气象因素为日照时数、风速。海拔高度与参考作物蒸散量呈显著的负相关关系,海拔高度是造成参考作物蒸散量地区差异的另一主要原因。

英文摘要:

In order to determine reasonable crop irrigation system under changing climate in the eastern plateau agricultural region of Qinghai province, reference crop evapotranspiration was analyzed through temporal-spatial variations. The reference crop evapotranspiration (ET₀) in the eastern agricultural region of Qinghai province from 1960 to 2006 was calculated by Penman-Monteith formula based on meteorological data of twelve meteorological observation stations. The Temporal-spatial variations of ET₀ were analyzed by the methods of Morlet wavelet analysis, Mann-Kendall test and GIS technology. The results showed that the regional average ET₀ appeared a trend of “marked-decrease” temporally. The abrupt change of ET₀ happened in 1974 approximately. The temporal variability of regional average ET₀ had a quasi-periodicity of about 25 years, which experienced three alternating stages (high? low?high). Spatially, there was a marked geographical difference in ET₀, which decreased from the Southeast to the Northwest. The ET₀ distribution in summer influenced the distribution of the ET₀ throughout the year. Sunshine hours and wind speed were the main meteorological factors which affect the ET₀ most. The ET₀ was negatively interrelated with the altitude of the area, which also caused significant differences of the ET₀ in different areas.

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