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中国区域蒸发潜力不均性发展趋势及其气候成因分析

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Analyzing potential evapotranspiration and climate drivers in China

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摘要

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摘要 气象台站20 cm蒸发皿观测资料自然正交分解显示,1980~2000年中国区域气温显著增加期间,长江中游至河套、东北等区域地表年蒸发潜力呈增加趋势;相反在长江以南、东部和西南等地区年蒸发潜力呈下降趋势.辐射观测资料分析结果表明,自20世纪70年代中国区域太阳入射能整体呈下降趋势,因此对于蒸发潜力增加的地区,太阳辐射产生的热力作用并不是决定蒸发潜力发展趋势的唯一原因.通过对大气风动力和干燥力等因子的分析证实,大气动力作用是造成中国区域地表蒸发潜力空间不均性分布的主要原因.同时1980~2000年NOAA-AVHRR遥感数据分析结果也表明,地表覆盖类型的变换以及植被覆盖率的下降,引发的地表热力作用和地表物理性质变化,是造成蒸发潜力空间分布不均性加大的另一项重要原因.

关键词: 蒸发潜力 热力作用 动力作用 归一化植被指数

Abstract: Empirical Orthogonal Function (EOF) analysis of 20 cm dish meteorological station data from 1980~2000 shows an increasing trend for potential evaporation in Northeast China and from the middle reaches of the Yangtze River to the Great Bend of the Huanghe River as temperatures increased significantly throughout China. On the other hand, the potential evaporation trend decreased in East China, Southwest China, and the regions south of the Yangtze River. Based on the observed decline in incident solar radiation from 1970s, we conclude that the effects of solar radiation are not the only factor to influence the trends of China's potential evaporation. We identify two factors contributing to the observed irregular distribution of potential evaporation. First, wind speed analysis and saturation vapor pressure field results (based on the vapor pressure deficit) suggest that the dynamic effect of the atmosphere contributes to potential evaporation. Second, remotely sensed 1980~2000 NOAA-AVHRR data shows that vegetation degradation in parts of China is correlated with changes in the thermal and physical land surface properties.

Keywords: Potential evaporation Thermal effect Dynamic effect NDVI

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