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近50年东北玉米生育阶段需水量及早涝时空变化

Crop water requirement and temporal-spatial variation of drought and flood disaster during growth stages for maize in Northeast during past 50 years

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中文关键词: [蒸散量](#),[作物](#),[气象](#),[作物需水量](#),[作物系数](#),[作物水分盈亏指数](#),[东北地区](#)

英文关键词: [evapotranspiration](#) [crop](#) [meteorology](#) [crop water requirement](#) [crop coefficient](#) [crop water surplus deficit index](#) [Northeast China](#)

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中文摘要:

分析近50 a东北玉米生育阶段的水分供需及早涝变化, 可以为防灾减灾对策的制定提供理论依据。该文基于东北地区48个农业气象观测站1961—2010年逐日气象资料、近20多年玉米生育期资料及近10 a农业灾情多元数据, 利用作物系数法计算4个生育阶段的需水量, 揭示东北玉米4个生育阶段水分供需的时空规律; 以作物水分盈亏指数为评价指标, 分析近50 a东北玉米不同生育阶段的旱涝分布及演变。结果表明: 东北玉米4个生育阶段及全生育期的需水量没有显著变化; 乳熟-成熟阶段, 有显著的干旱化趋势, 其它3个阶段和全生育期没有明显的旱涝变化。4个生育阶段需水量空间差异较大, 基本呈带状分布。播种-七叶期, 中旱及以上、中涝及以上灾害频率较低; 后3个生育阶段, 中旱及以上、中涝及以上灾害频率较高, 且全域、区域旱涝现象呈明显的年代际变化特征, 从20世纪80年代起全域、区域中旱及以上、中涝及以上次数明显增加。

英文摘要:

It is essential to comprehensively analyze the rules of water demand and supply and the variation of drought-flood disaster of growth stages for maize in Northeast China over the recent 50 years to provide theoretical basis for strategies of preventing and reducing disasters. The multivariate data including daily meteorological data during 1961-2010, maize growing records over the past 20 years, and agriculture disaster data in the recent 10 years for 48 agro-meteorological observation stations across Northeast China were used. Based on these data, the water requirement of the four growth stages were calculated using crop coefficient method to reveal the temporal-spatial distribution of maize water supply and demand over Northeast China. The drought-flood distribution and evolvement of maize during different growth stages in Northeast of the recent 50 years were analyzed using the crop water surplus deficit index as the assessment index. Results showed that the water demand of maize during the four growth stages and the whole growing period didn't have an appreciable change. There was a significant aridity tendency during milky ripening to maturation, while during the other three stages and the whole growth period there were no significant changes of drought or flood. Different spatial distribution patterns of water demand were found for the four growth stages, with a band distribution. From sowing to seven-leaf period, the frequency of middle drought or above and middle flood or above was lower, while during the followed three growth stages, the frequency was higher. Widespread and regional middle drought or above and middle flood or above of growth stages had obvious decadal changes. From 1980s, the number of widespread and regional middle drought or above and middle flood or above increased significantly.

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