

农村发展—生态资源环境

基于GIS的山东省无霜期时空动态变化特征

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摘要:

为了全面分析山东省49年来霜冻的变化趋势,为区域作物结构调整及选取合适生育期的品种提供参考,应用山东省86个气象观测站1961—2009年的气象资料和山东省1:25万数字高程,采用回归分析法对山东省的初、终霜日及无霜期进行计算,用GIS工具对其进行栅格化,得到15幅栅格面层,并分别对各栅格层进行空间分析和统计计算,并用Mann-Kendall对结果进行检验。结果表明:(1)在空间上,山东省的各个年代终霜日首先从鲁西南开始,由西南逐步向东北方向展开,最迟的是鲁中山区和山东半岛,但各地的终霜日时间在不同年代有一定的变化;初霜日首先从鲁中山区开始,由鲁西北逐步向鲁东南开展,初霜日最晚的是鲁南南部和鲁东南沿海;各个年代平均无霜期天数由北向南增加。(2)在时间上,20世纪70年代终霜日最迟,2001—2009年最早;初霜日是60、70年代最早,2001—2009年最迟;无霜期天数最少的是60、70年代,2001—2009年最多。1961—2009年山东省的终霜日变化倾向率为-2.6天/10年,统计量U为-4.00,通过显著性水平 $\alpha=0.01$ 的检验,有明显提前的趋势;初霜日变化倾向率为2.0天/10年,统计量U为3.45,有明显后推的趋势;无霜期变化倾向率为4.6天/10年,统计量U为4.93,有明显增多的趋势。

关键词: 无霜期

The Spatio-Temporal Characteristics of Dynamic Change of Frost-Free Period in Shandong Province Based on GIS

Abstract:

For comprehensive analysis of trends in frost 49 years and providing reference for regional crop structure adjustment and selecting appropriate species for varieties growing period, based on the meteorological data from 1961 to 2009 of 86 meteorological stations and digital elevation models (1:250 thousand) in shandong province, the method of regression analysis was adopted in calculating the first/last frost dates and frost-free period. Statistical analysis and spatial analysis were carried out 15 grid layers with the first/last frost dates and frost-free period by GIS, and the results were tested by Mann-Kendall. The results showed that: (1)in spatial, the last frost dates start with southwest, and gradually to the northeast direction from southwest, the latest were the shandong peninsula and the central mountain in shandong province; But, the latest frost date had certain changes in different area and in different age. The first frost dates start with northwest, and gradually to the southeast direction from northwest, the latest were the department of lunan and southeast coast; all the average age of frost-free periods on the number of days increasing from north to south. (2)In temporal, the latest was 70s of the 20th of the last frost date, the earliest was average of 2001-2009; The first frost date was on the contrary. The earliest was 70s of the first frost date, the latest was average of 2001-2009. The least of frost-free period were 60s, 70s of the 20th, the longest was average of 2001-2009. Tended to rate of last frost date was -2.6d/10 a, the tendency was statistically significant by 0.01's check, there was obviously ahead trend in series of last frost date. Tended to rate of first date was 2.0d/10a, it also passed a checkout, and there was obviously postpone trend in series of first frost date. Tended to rate of frost-free period was 4.6d/10 a, it also passed a checkout, and there was obviously increase trend in series of first frost date.

Keywords: frost free period

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