

论文

气候变暖背景下安徽省冬小麦产量对气候要素变化的响应

唐为安¹, 田红¹, 陈晓艺², 温华洋¹, 丁霞¹, 徐光清¹

- 1. 安徽省气候中心, 合肥 230031;
- 2. 安徽省气象科学研究所, 合肥 230031

摘要:

论文在分析安徽省近47 a(1961—2007年)来气候要素及冬小麦产量变化特征,确定产量突变点的基础上,采用相关分析,提取影响产量形成的气候因子,构建安徽省冬小麦气候产量模型,并利用该模型定量地估算了近47 a来气候要素变化对冬小麦产量的贡献率。结果表明:安徽省冬小麦生长季内的平均气温增暖趋势明显,降水量无明显变化趋势,但年际波动大,日照时数呈显著下降趋势。越冬期最高气温、返青期最低气温和灌浆期日照时数与产量呈显著正相关,灌浆期降水量与产量呈显著负相关。近47 a来,气候要素变化对冬小麦产量存在微弱的负贡献,贡献率为-5.89%。冬小麦生长季内一定程度的暖干化条件有利于产量的增加。

关键词: 气候变暖 Mann-Kendall法 冬小麦产量

Response of Winter Wheat Yield to Climate Change under Global Warming in Anhui Province

TANG Wei-an¹, TIAN Hong¹, CHEN Xiao-yi², WEN Hua-yang¹, DING Xia¹, XU Guang-qing¹

- 1. Anhui Province Climate Center, Hefei 230031, China;
- 2. Anhui Institute of Meteorological Science, Hefei 230031, China

Abstract:

In order to study the impacts of climate change on winter wheat yield under global warming, the contribution of climate change to winter wheat yield was analyzed in the north of Anhui Province. Based on the determination of the mutation point of winter wheat yield from the analysis of characteristics of climate elements and winter wheat yield, the extraction of climate factors that related with yield and the establishment of the climatic yield model using regression, the contribution rate of climate change to winter wheat yield was calculated quantitatively by the model for the north of Anhui Province from 1961 to 2007. The result showed that: average temperature had a significant increase, precipitation had unobvious trend but significant fluctuation, and sunshine had a significant decrease during the growing period of winter wheat in the north of Anhui Province. Over-wintering stage maximum temperature, regreening stage minimum temperature and grain-filling stage sunshine were significantly positively correlated with wheat yield, but grain-filling stage precipitation was significantly negatively correlated with wheat yield. In the past 47 years, over-wintering maximum temperature and regreening stage minimum temperature had risen by $0.028\text{ }^{\circ}\text{C} \cdot 10\text{ a}^{-1}$ and $0.855\text{ }^{\circ}\text{C} \cdot 10\text{ a}^{-1}$, grain-filling stage precipitation and sunshine had decreased by $-1.157\text{ mm} \cdot 10\text{ a}^{-1}$ and $-2.695\text{ h} \cdot 10\text{ a}^{-1}$. The climate change had a weak negative contribution to winter wheat yield and the contribution rate was -5.89%. In this paper, the climatic yield model could reflect the contribution of climate change to winter wheat yield in the north of Anhui Province in the past 47 years. A certain degree of warm and dry climatic conditions was beneficial for winter wheat yield formation during the winter wheat yield growing period.

Keywords: climate warming Mann-Kendall yield of winter wheat

收稿日期 2010-04-09 修回日期 2010-08-31 网络版发布日期

DOI:

基金项目:

中国气象局2009年气候变化专项“华东区域气候变化影响评估报告”(CCSF-09-10);安徽省气象局面上项目(KM0902)。

通讯作者:

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