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近50年宁夏极端气温事件的变化研究(PDF)

《自然灾害学报》[ISSN:/CN:23-1324/X] 期数: 2012年04期 页码: 152-160 栏目: 出版日期: 2012-08-30

Title: Extreme event changes of air temperature in Ningxia in recent 50 years

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关键词: 宁夏; 极端气温事件; 空间分布; 年代际变化

Keywords: Ningxia; extreme air temperature event; spatial distribution; inter-decadal variation

分类号: P461

DOI: -

文献标识码: -

摘要: 随着全球变暖,极端气候事件频繁发生,由此造成气象灾害的数量日益增加。深入研究极端气候的变化特征,能够为预测和预防极端事件灾害提供参考依据。采用线性倾向估计法、反距离加权法和R/S分析法,选取10个极端气温指标研究了宁夏近50年来极端气温事件的时空变化特征,并在此基础上尝试预测了未来该地区极端气温变化的情形。结果发现:全天极端高温天数、白天极端高温天数、夜间极端高温天数、生物生长季和夏季天数分别以0.76、0.48、0.67、0.35和0.29 d/a的趋势明显增加,而全天极端低温天数、白天极端低温天数、夜间极端低温天数和最大连续霜冻天数分别以-0.40、-0.25、-0.66和-0.30 d/a趋势显著减少,极端气温年较差也呈下降趋势(-0.02℃/a),且空间差异明显;除极端气温年较差外,其它各极端气温指标与年平均气温均有很好的相关性;年极端冷指标和极端气温年较差在未来将继续下降,极端暖指标在未来将继续上升;宁夏气象灾害所造成的影响和损失将进一步增大。

Abstract: With the sustained global climatic warming, extreme weather and climate events occurred frequently and the number of meteorological disasters is growing. Deeply understanding the characteristics of the extreme climate could provide a reference basis for disaster forecast and prevention. So in this paper, the spatial and temporal variability of extreme events of temperature in recent 50 years was analyzed using the methods of regression analysis, inverse distance weighted and

rescaled range analysis and ten indices of extreme temperature. With the analysis, the extremely temperature variation in the future was predicted. The thresholds of the extreme high temperature days and the extreme low temperature days were determined for different stations. The results are as follows: all-day warm days, warm days, warm nights, growing season length and summer days have significantly increased by 0.76, 0.48, 0.67, 0.35 and 0.29 d/a, respectively; over the same period, all-day cold days, cold days, cold nights and consecutive frost days have significantly decreased by -0.40, -0.25, -0.66 and -0.30 d/a, respectively; the annual temperature range exhibits a decreasing trend (-0.02℃/a); in spite of the above-mentioned main trend in most parts, the differences in spatial distribution still exist significantly; except for the annual temperature range, other indices correlate with annual mean temperature very well; cold extremes and annual temperature range would keep decreasing while warm extremes would continue rising; the damage and effect caused by meteorological disasters would become more and more extensive in Ningxia.

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备注/Memo: 收稿日期:2011-10-18;改回日期:2011-12-20。
基金项目:国家自然科学基金项目(41161012);教育部新世纪优秀人才支持计划(NCET-10-0019);国家重点基础研究发展规划(973)项目(2010CB951003)
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