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## 北京地区气候变量的多分形特征研究

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The multi-fractal characteristics of climate variables in Beijing

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摘要

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**摘要** 在气候系统的变量时间序列中往往存在着不同尺度间的自相似结构,这种自相似结构,又称为分形的特征.本文运用多分形分析方法(MF-DFA),分析北京市近50年来不同气象变量的逐日序列,并用一个扩展的二项式串级模式来分别估计其多分形,平均气温等变量表现出多重分形的特征,并且多分形谱宽一致.而气温日较差和日照时数则表现出单分形的特征.且这种分形记忆性相关,为中长期气候预测提供了理论基础.

**关键词:** 多分形 标度指数 多分形去趋势波动分析

**Abstract:** Variables of climate system often exhibit self-similar behavior over different time scales in which is also known as fractal characteristics. Multi-fractal behaviors of the long daily climate variable in Beijing were analyzed by using multi-fractal detrended fluctuation analysis (MF-DFA). The result indicates that most climate variables exhibit multi-fractal characteristics, but sunshine duration and diurnal temperature show mono-fractal behaviors in Beijing. We fitted generalized Hurst exponent via a modified generalized multiplicative cascade model and different widths of multi-fractal spectrum are estimated.

**Keywords:** Multi-fractal Scaling exponent MF-DFA

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