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陕南地区清代霜雪灾害及分形特征研究(PDF)

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Title: Research on frost/snow disaster and its fractal characteristics in southern Shaanxi during Qing Dynasty

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关键词: [陕南地区](#); [清代](#); [霜雪灾害](#); [分形特征](#); [灾害成因](#); [寒冷气候事件](#)

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摘要: 通过对陕南清代历史文献资料的搜集、整理和分析,研究了清代(1644-1911年)陕南霜雪灾害等级、阶段变化及不同等级灾害周期性等。统计分析显示,陕南清代发生霜雪灾害28次,平均每9.57年发生一次;霜雪灾害可划分为轻度、中度、重度三级,各占灾害总频次的21%,72%和7%;清代霜雪灾害可分为4个阶段,其中1644-1668年和1819-1868年的第1、第3阶段为灾害多发期,而1669-1818年和1869-1911年的第2、第4阶段为灾害少发期。霜雪灾害的自相似性揭示了灾害的分形性,分形结果显示陕南地区清代各等级灾害呈周期变化,且这些灾害的集中性非常强。陕南清代轻度、中度和重度霜雪灾害发生分别存在着16~18 a,7~8 a和46 a振荡周期。该地区霜雪灾害的发生主要是偏暖月的持续性降雪、积雪或由寒流引起的气温骤降造成的。初步确定陕南清代发生了两次霜雪灾害气候事件,时间在公元1649-1663年和1817-1842年。

Abstract: After collecting, reorganizing and analyzing history data about southern Shaanxi during Qing Dynasty, the grade series, stage changes and different grades' periodicity of the frost and snow disasters were studied in this paper. The statistical results show that, frost and snow disasters occurred 28 times in Qing Dynasty, and the occurrence rate is once per 9.57 year on average. The frost

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and snow disasters in southern Shaanxi of Qing Dynasty' s could be divided into mild, moderate and severe in grades, and their occurrence probability are 21%, 72% and 7%, respectively. The disasters can be classified into four periods, when during the first period from 1644 to 1668 and the third period from 1819 to 1868, disasters occurred more often, while during the second period from 1669 to 1818, and the fourth period from 1869 to 1911, disasters occurred less often. The self-similar properties of frost and snow disasters reveal the sequence' s fractal feature, which shows that the different grades of frost and snow disasters in the southern Shaanxi changed periodically, and have a strong characteristic of concentricity. The mild, moderate and severe disasters have the occurrence period of 16~18 a, 7~8 a, 46 a respectively. The primary cause of the frost and snow disasters in the area is the sustainable snowfalls, accumulated snows and sudden drop of air temperature in warmer months. Therefore, primary conclusions can be made that there were two cold climatic events in the southern Shaanxi in Qing Dynasty, which occurred during 1649-1663 and 1817-1842 respectively.

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