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Title: Analysis and numerical simulation of low temperature and frozen rain/snow weather in Hunan Province in 2008

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关键词: [冰冻天气](#); [成因](#); [数值模拟](#); [湖南省](#)

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摘要: 利用湖南省地面观测站点资料、探空资料、NCEP再分析资料及海温资料对该省2008年1月中旬至2月上旬异常低温雨雪冰冻天气形成原因进行了分析,结果表明:长时间的大气环流异常是造成此次低温雨雪冰冻天气的主要大气环流背景;温度的垂直结构分析表明,925~700hPa长时间存在强的逆温层,为冰冻提供了有利的形成环境;海温异常对气温有一定的影响作用,在拉尼娜起始年,湖南冬季平均气温偏低,出现“冷冬”的概率较大。通过中尺度数值天气预报模式MM5的模拟,也间接印证了冰冻的形成过程。最后,针对此异常低温雨雪冰冻天气发生特点,提出在气候变暖的大背景下仍要加强冬季极端气象灾害的研究和防范,同时加强和完善灾情上报制度。

Abstract: Based on the meteorological stations' observations, radionsonde records, NCEP reanalysis data and SSTA, the severe cold air, snow storm and frozen rain events in Hunan Province were studied, and the events occur in whole south China during the middle of Jan. to the beginning of Feb., 2008. The results show that, firstly, the longterm lasting atmospheric circulation abnormality is the main atmospheric circulation background; Secondly, by analyzing the vertical structure of temperature, we find the strong thermal inversion constantly existing between 925hPa and 700hPa offers a favorable condition for frozen rain; Thirdly, SSTA abnormal plays a positive role to some extent in this low temperature. According to statistics, in the start year of Lania, the winter mean temperature is lower than

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that in other year in Hunan Province, that is to say, it is easily being a cold winter. The MM5, a meso-scale numeric model, was used to simulate the weather process of the selected frozen rain days, and the results also verify the formation process of the frozen rain and snow. Finally, in view of the characteristics of cold air, snow storm and frozen rain, a standpoint is offered that the research on winter's severe weather disaster should be strengthened and the disaster prevention and mitigation measures should be improved thought climate is getting warmer, as the same time, the disaster situation report mechanism should be enhanced and perfected.

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