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## 南方持续低温冻雨事件预测的前期信号

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Precursors to predict low-temperature freezing-rain events in southern China

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摘要

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摘要 1960—2008年冬季期间,中国南方发生了23次低温冰冻(冻雨)天气事件,其中满足站日数大于10的事件有11次.2008年初中国南方发生了一场影响巨大的区域持续性低温冻雨天气事件,2011年初再次发生了类似的区域持续性低温冻雨事件.提前5天预报这类极端事件是国内外大气科学面临的难题.利用去逐日气候变化后的逐日850 hPa温度扰动,可以提前3~10天发现中国南方持续低温雨雪冰冻(冻雨)事件发生的信号.2008年初和2011年初,影响中国南方的850 hPa冷空气扰动具有源地和路径相似性,它们都来自北非-中东并绕过青藏高原北侧到达中国南方,在对流层大气中形成“冷-暖-冷”的温度垂直结构.通过对欧洲中期天气预报模式产品中850 hPa温度扰动的相似性分析,成功地提前4~9天实际预报出了2011年初的中国南方低温冻雨天气过程.

关键词 低温, 冻雨, 极端天气事件, 前期信号, 预测

Abstract: During the winter season in 1960 to 2008, 23 low-temperature freezing rain events occurred in southern China, and only 11 events came with more than 10 station days. In the early 2008, a regional persistent freezing rain event occurred in southern China, while in the early 2011, a similar event happened again. How to predict this kind of extreme weather events in advance by 5 days is a tough problem in the atmospheric society at present. The precursor of low-temperature freezing rain event in southern China can be found in 3 to 10 days in advance, by using the daily 850 hPa regional-scale temperature transient anomalies after removing the daily climate change. The initial position and path of the 850hPa temperature transient anomalies in the early 2008 and the early 2011 in southern China are similar, propagating cold signals from North Africa-Middle East, coming around the north of the Tibetan Plateau to southern China, and forming a vertical temperature structure of "cold-warm-cold pattern" in the troposphere. By analysis of similarity with daily 850 hPa temperature transient anomalies data from ECMWF products, the early 2011 freezing rain event in southern China was successfully predicted 4 to 9 days in advance.

Keywords Low temperature, Freezing rain, Extreme weather event, Precursor, Prediction

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