



“黑格比”后期异常强降水形成机理分析

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摘要 0814号强台风“黑格比”2008年9月25日08时减弱成低压进入越南高平后, 在外围云系有明显中尺度对流云团发展, 引发广西西南部新一轮比热带风暴本身更具破坏力的暴雨到大暴雨降雨。对美国国家环境预报中心(NCEP)提供的再分析资料、常规观测资料及雷达回波等研究结果, 认为南亚高压西退造成负涡度向对流层中低层延伸, 使500hPa的西太平洋副热带高压出现减弱东退现象, 成为低压后部对流云团在广西西南部停滞发展的背景条件。造成此次暴雨的4个中尺度对流云团, 都是沿着暖切变右(北)侧100—200km范围内从东南往西北方向产生、移动的, 中尺度降水落区呈东南-西北的带状分布。暖切变、垂直方向上的抽吸作用、 θ_{se} 的高值始终呈“漏斗状”的湿中性特征以及湿Q矢量对次级环流的激发作用等是此次低压后部中尺度对流云团的加强机制; 而湿舌、湿Q矢量辐合区与未来强降水出现区域、出现时间对应较好。

关键词: 黑格比 暖切变 湿Q矢量 湿中性结构 中尺度对流

Abstract: The No. 0814 Typhoon Hagupit was weakened to a cyclone as soon as it made a landfall in Caobang, Vietnam, at 8 am on September 25th, 2008. With the development of meso-scale convective clouds (MCCs) that were generated outside the cloud system of the cyclone, a destructive rainfall was triggered in southwestern Guangxi, even much heavier than the one caused by a typical tropical storm. Analysis of the United States National Center for Environmental Prediction (NCEP) data indicated that negative vorticity extended to the middle and bottom of the troposphere as a result of westward retreat of the South Asia High; as a result, the western Pacific subtropical high at 500 hPa became weaker and retreated toward east to be the background condition of the standstill and the development of convective clouds in southwestern Guangxi. Four MCCs that caused the rainfall were generated in 100 - 200 km range of the right side of the warm shear; in other words, they were to the north of the warm shear, and moved from southeast toward northwest. The precipitation field showed a southeast-northwest quasi-zonal rainfall distribution. Warm shear, vertical pumping effect, neutral wet character of the lines of θ_{se} high value formed in funnel shape, and the wet Q vector's activation of the secondary circulation helped to strengthen the MCCs. The wet tongue and wet Q vector convergence zone were good reflections of the region and the time of latter heavy precipitation emergence.

Keywords: Hagupit; warm shear; wet Q vector; neutral wet structure, mesoscale convective

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