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一次中尺度对流系统的形成发展特征分析 (PDF)

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Title: Characteristic analysis of formation and development of a mesoscale convective system

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关键词: 华北冷涡; 强对流天气; 中尺度对流系统

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摘要: 通过分析2008年6月23日形成于冷涡成熟阶段的中尺度对流系统(MCS)的发生发展特征,得到:(1)MCS发生发展过程中,高空强垂直风切变维持,低层垂直风切变迅速增大。(2)湿Q矢量的低层辐合、高层辐散,加强了上升运动和次级环流,前者的增大对MCS的发展起了更大的作用。(3)雷达图上弱回波区、回波悬垂结构、三体散射现象、大的垂直累积液态水及低层速度图上的气旋式辐合的出现是冰雹发生前的有利信号。(4)湿斜压性及风垂直切变增大可能会促发MCS发生。地面风场辐合和水汽辐合加强了MCS的发展。对流层中高层干冷空气的侵入,使不稳定能量释放,导致了强对流天气的发生。

Abstract: This paper analyzed the evolution features of the mesoscale convective system(MCS) in the mature stage of cold vortex occurred on June 23, 2008. The results include: (1) In the process of the formation and development of MCS, the high-level strong vertical wind shear maintains and the low-level vertical wind shear

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increases rapidly. (2) The convergence in the high-level and divergence in the low-level of wet Q-vector can enhance the upward motion and the secondary circulation, and the increase of the former plays a greater role in the development of MCS. (3) The appearance of weak echo area, echo overhanging structure, three-body scattering phenomena, the large vertically integrated liquid and the cyclonic convergence in lower velocity diagram, are the favorable signals to the occurrence of hail. (4) Wet baroclinicity and the increases of vertical wind shear may trigger the MCS. The convergence of wind and moisture on ground