

论文

东北冷涡引发的局地暴雨数值模拟研究

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摘要 利用CDAS-NCEP/NCAR再分析资料,应用Penn State/NCAR的高分辨率中尺度模式MM5V3-7,成功模拟出2005年7月9—12日东北冷涡诱发的一次连续雷雨过程,重点分析了7月9日造成沈阳及周边地区的一次局地暴雨过程,并对其中的一个连续发展的中 β 尺度对流系统的演变、中尺度结构特点进行了研究。结果表明:冷涡总是以水平旋转的中高层的干冷空气堆作为其结构特点。在冷涡的东南侧高空干冷堆的边缘区域,轨迹呈直立状,从行星边界层向上穿越整个对流层,显示出该地区存在强对流。干冷堆的边缘区域下方的低层暖湿输送是冷涡局地强对流发展的关键。局地对流发展时,出现干冷堆的边缘区域的 S_e 上下层接近或者打通现象。

关键词 [东北冷涡](#) [连续雷雨](#) [数值模拟](#)

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Numerical simulation on the local storm caused by northeast cold vortex

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Abstract Based on the CDAS-NCEP/NCAR reanalysis data, a sequence thunderstorm process caused by northeast cold vortex from 9 to 12 July, 2005 was simulated by mesoscale model MM5V3-7 of Penn state/NCAR. The local storm process in Shenyang and the surrounding areas on 9th July, 2005 was analyzed, and the evolution of β mesoscale convective system and its structure features were discussed. The results indicate that cold vortex always has a biggish bound cold air pool in middle and high level. On the southeast side of cold vortex, the margin area of high level dry and cold pool takes on erect shape from boundary layer to troposphere layer. It indicates that there exists a strong convection. Warm and wet air flow in lower level below the margin areas of dry and cold pool plays an important role in the local strong convection of cold vortex. The up layer and down layer of S_e in margin areas of dry and cold pool can approach or get through when the local convection develops.

Key words [Northeast cold vortex](#) [Sequence thunderstorm](#) [Numerical simulation](#)

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