

國立中央大學大氣物理研究所書報討論

Date: 2023/12/01

Location: S1-713

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Cloud Vertical Structure of Stratiform Clouds with Embedded Convections Occurring in the Mei-Yu Front

Abstract

In this study, it analyzed the Cloud Vertical Structure (CVS) of the three Stratiform Clouds with Embedded Convection (SCEC) cases occurring in the mei-yu fronts over central-eastern China on 22, 28 June and 11 July 2020 based on the combination of the S-band Doppler weather radar, the C-band Frequency Modulation Continuous Wave (C-FMCW) radar and the Microrain Radar (MRR). The reflectivity of the S-band Doppler weather radar shows that there are multiple strong echo bands embedded in the stratiform cloud echo in the vertical direction, and it indicates that the clouds of the three cases were mainly composed of SCEC.

By analyzing the C-FMCW radar data, the rain rate of the embedded convection is higher than that of the surrounding stratiform clouds. In the case on 28 June, due to the vigorous development of embedded convection, the cloud particles in the upper layer show an upward movement, and there is a high falling speed appearing near the particle rising region, indicating that there are larger high-density precipitation particles, such as hail or heavy rimmed particles, present in the cloud. Therefore, we speculate that the growth rate of particles in the upper region of the embedded convection is higher than that in the stratiform regions. By analyzing the MRR data, the comparison of the vertical distribution of Drop Size Distributions (DSDs) between embedded convection and stratiform cloud shows that the three cases have common variation characteristics, and the collision-coalescence process of the drops in the embedded convection is stronger than that in the stratiform region.

Keywords

Stratiform Clouds with Embedded Convection (SCEC)
Drop Size Distribution (DSD)

Reference

Zhu S., Y. Yuan, Y. Wu, Y. Zhang, 2022: Cloud Vertical Structure of Stratiform Clouds with Embedded Convections Occurring in the Mei-Yu Front. *Atmosphere*, **13**(7), 1088, <https://doi.org/10.3390/atmos13071088>