

# Preliminary Research on Flooding Torrential Rain Caused by Interaction of MCC and Meso- $\beta$ Scale Convective Cell in China

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## Abstract

Using various synoptic data as satellite image, NCEP data, surface observation data and upper level wind data, the two flash flood events caused by interaction of MCC and meso- $\beta$  scale convective cell were studied. Results show that: (1) the torrential rain area caused by interaction of MCC and meso- $\beta$  scale convective cell is small and its precipitation intensity is big, so its disaster is specially big; (2) the background circulation favorable to eastward motion of MCC and meso- $\beta$  scale convective cell developing are composed of strong divergence development on 200 hPa level, generation and stability of lower-level jet stream on 850hPa, eastward motion of horizontal shear at the front of lower-level jet stream with convergence development on 500 hPa; (3) the lower-level jet stream provided water vapor and energy transportation for MCC and meso- $\beta$  scale convective cell developing; (4) wind shear on the ground surface and motion of the low-value tongue of surface energy ratio contributed to one of triggering mechanisms of MCC and meso- $\beta$ -scale convective cell development. The high-value region generation, motion of low-value tongue and shear line on surface, and generation of large gradient region of surface energy ratio showed indication to generation and evolution of MCC and meso- $\beta$ -scale convective cell; (5) generation and change of high-value region of CAPE with low-energy tongue on lower level of troposphere, frontogenesis, and Z-spiral change also show indication to generation and evolution of MCC and meso- $\beta$ -scale convective cell; (6) the strong divergence developing on upper level and the strong upward motion generating in region containing MCC are the dynamic mechanism for development and maintenance of MCC and meso- $\beta$ -scale convective cell; (7) the two torrential rain events are characterized in complete different 3-dimensional vorticity structure which deserves special attention in torrential rain forecast service of this kind; (8) On the basis of further research for two torrential rain events, the conceptual model of the flooding torrential rain caused by interaction of MCC and meso- $\beta$  scale convective cell is offered.

Key words: MCC meso- $\beta$  scale convective cell torrential rain interaction