

國立中央大學大氣物理研究所書報討論

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Mesoscale Influences of Land Use, Topography, Antecedent Rainfall, and Atmospheric Conditions on Summertime Convective Storm Initiation under Weak Synoptic-Scale Forcing

Abstract

Short-lived summer storms often bring heavy rainfall and lead to disasters. However, compared to storms with stronger synoptic scale dynamic forcing (such as winter cold fronts), the predictability of convection initiation (CI) is lower under weakly forced conditions in summer. Therefore, a dual-summer experiment in the Southeast United States (SEUS) was conducted to investigate the relationship between geographic and meteorological variables and CI events. Boxplot results indicated that CI events were associated with higher average humidity and instability, although these differences did not reach statistical significance. Random forest importance analysis revealed that topography was the most influential geographic variable. The overall conclusion is that summertime CI events occur largely at random; however, land surface and meteorological conditions indeed show a degree of influence on CI occurrence.

Keywords:

Convection Initiation (CI)

Reference:

Tracy, C., and J. R. Mecikalski, 2023: Mesoscale Influences of Land Use, Topography, Antecedent Rainfall, and Atmospheric Conditions on Summertime Convective Storm Initiation under Weak Synoptic-Scale Forcing. *Wea. Forecasting*, 39, 55–74, <https://doi.org/10.1175/WAF-D-22-0216.1>.