國立中央大學大氣物理研究所書報討論

Date: 2025/12/05

Location: S1-713

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Analysis of a Dryline during IHOP: Implications for Convection Initiation

Abstract

This study presents a detailed analysis of a dryline that occurred on 22 May 2002 during the International H_2O Project (IHOP). The event was classified as a null case for convection initiation (CI) because air parcels lifted by the convergence boundary were unable to reach the level of free convection (LFC). Airborne doppler radar data revealed a distinct reflectivity pattern resembling a core/gap structure along the dryline, with misocyclones located within the reflectivity gap regions. These circulations actively advected moisture, creating distinct wave patterns in the humidity field. Although radar refractivity retrieved from ground-based radar accurately depicts low-level moisture fields, its application in forecasting convection initiation has previously been restricted to qualitative interpretations.This study introduces the total derivative of radar refractivity DN/Dt as a forecasting parameter. Results indicate that maxima of DN/Dt spatially correlated with developing cumulus clouds, suggesting its potential utility for improving nowcasts of convection.

Keyword

Dryline, Refractivity, Reflectivity

Reference

Wakimoto, R. M., and H. V. Murphey, 2009: Analysis of a dryline during IHOP: Implications for convection initiation. Mon. Wea. Rev., **137**, 912–936, https://doi.org/10.1175/2008MWR2584.1.