



Destabilization and Convection Initiation in Coastal Regions: New Perspectives Through Fieldwork and Idealized Modeling Efforts

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The evolution of the marine atmospheric boundary layer as it is advected inland during the warm season plays a critical role in the initiation—or suppression—of convection in the Great Lakes coastal environment. Gaining a deeper understanding of these transitions and their effects on convection is of significant importance, particularly given the large population in many coastal areas. To address this, the National Science Foundation-funded **Maritime to Inland Transitions Towards ENvironments for Convection Initiation (MITTEN-CI)** campaign was conducted in July 2024, with the goal of developing an extensive dataset that could effectively characterize these transitions. Over-lake thermodynamic and kinematic profiles were observed by Uncrewed Aircraft Systems (UAS), while sampling of boundary layer spatial and temporal variability over land was observed by a 120 km long shore-perpendicular transect including six flux towers, two mobile mesonets, multiple radiosonde launch sites, a Doppler LiDAR, and two mobile Ka-band Doppler radars. This dataset enables hypothesis testing that will result in new knowledge of processes that support the development of instability maxima on the cool side of lake-breeze fronts (LBFs), the potential for diffuse LBFs to exist embedded within synoptic-scale onshore flow and influence CI, the prevalence of misovortices at intersections of horizontal convective rolls and the LBF, RKW theory's relation to the vertical structure of the LBF, and the influence of entrainment on the thermodynamics and structure of the boundary layer and the LBF. This talk will provide an overview of the MITTEN-CI campaign, highlighting the unique data collected, with additional insights provided through analysis of relevant idealized simulations.

Thursday, 13 March 2025, 2:00PM

Refreshments 1:45PM

Please also join colleagues for refreshments and informal discussion after the seminar until 3:30pm

NCAR-Foothills Laboratory, 3450 Mitchell Lane
FL2-1022, Large Seminar

Seminar will also be live webcast

<https://sundog.ucar.edu/public/page/MMM>

Participants may ask questions during the seminar via Slido.