

Abstract

A numerical mesoscale model (COAMPS) is used to study some of the features associated with the evolution of the kinematic, thermodynamic, and physical structure of the Alabama sea and bay breeze circulations and convections in weak shear environments based on five cases from Medlin and Croft (1998). The general and expected features and evolution of sea and bay breeze circulations are captured by the model simulations, including horizontal and vertical wind shifts, thermal contrast between land and water surface, vertical stability over water and land, return currents and moisture increase. The relationship of these circulations to specific synoptic flow regimes and local physiographic features was investigated. The sea breeze triggered convective cells are confirmed to have a preferred location according to the flow regime and local conditions. This result can assist the forecasters in understanding the anticipated convective cell initiation and development on a given day as related to sea and bay breeze cells as well as improve the short-term forecast accuracy of the location of thunderstorm initiation based on routine observations and subsequent convective activity.