Objectively Assessing Characteristics of Mesoscale Convective Organization in an Operational Convection Permitting Model

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he realism of convective organization in operational convection-permitting model simulations is objectively assessed, with a particular focus on the mesoscale aspects, such as convective mode. A tracking and classification algorithm is applied to observed radar reflectivity and simulated radar reflectivity from the operational ACCESS-C convection-permitting forecast domain over northern Australia between October 2020 and May 2022, and the characteristics of real and simulated convective organization are compared. Mesoscale convective systems from the operational forecast model are approximately twice as likely to be oriented parallel to the ambient wind and ambient wind shear than those observed by radar, indicating a bias toward the “training line” systems typically associated with more extreme rainfall. During highly humid active monsoon conditions, simulated convective systems have larger ground-relative speeds than systems observed in radar. Although there is less than 5% difference between the ratios of simulated and observed trailing, leading and parallel stratiform system observations, significant differences exist in other wind shear–based classifications. For instance, in absolute terms, simulated systems are 10%–35% less likely to be upshear tilted, and 15%–30% less likely to be downshear propagating than observed systems, suggesting errors in simulated cold pool characteristics.