

Abstract Submitted  
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**Identifying Meteorological Controls on Open and Closed Mesoscale Cellular Convection as Associated with Marine Cold Air Outbreaks**<sup>1</sup> ISABEL MCCOY, ROBERT WOOD, University of Washington Atmospheric Sciences, JENNIFER FLETCHER, University of Leeds Institute for Climate and Atmospheric Science — Marine low clouds are key influencers of the climate and contribute significantly to uncertainty in model climate sensitivity due to their small scale and complex processes. Many low clouds occur in large-scale cellular patterns, known as open and closed mesoscale cellular convection (MCC), which have significantly different radiative and microphysical properties. Investigating MCC development and meteorological controls will improve our understanding of their impacts on the climate. We conducted an examination of time-varying meteorological conditions associated with satellite-determined open and closed MCC. The spatial and temporal patterns of MCC clouds were compared with key meteorological control variables calculated from ERA-Interim Reanalysis to highlight dependencies and major differences. This illustrated the influence of environmental stability and surface forcing as well as the role of marine cold air outbreaks (MCAO, the movement of cold air from polar-regions across warmer waters) in MCC cloud formation. Such outbreaks are important to open MCC development and may also influence the transition from open to closed MCC. Our results may lead to improvements in the parameterization of cloudiness and advance the simulation of marine low clouds.

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