UNIVERSITY of HAWAI'I MĀNOA

Department of Atmospheric Sciences Seminar Announcement

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SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY

Convection Initiation and Growth at the Coast of South China: Effects of the Low-level Jet, Terrain, and Cold Pools

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Date:	**Wednesday, February 3, 2021**
Time:	**3:30pm HST**
Zoom Meeting:	**https://zoom.us/j/93583080682** Meeting ID: 935 8308 0682 Passcode: 6daVMR

Abstract:

Convection initiation (CI) and the subsequent upscale convective growth (UCG) at the coast of South China in a warm-sector heavy rainfall event are shown to be closely linked to a varying low-level jet over the northern South China Sea (NSCS). The nocturnal LLJ peaks at 950 hPa and significantly intensifies with turning from southwesterly to nearly southerly by inertial oscillation. The strengthened LLJ promotes mesoscale ascent on its northwestern edge and terminus where enhanced convergence zones occur. Located directly downstream of the LLJ, the coastal CI and UCG are dynamically supported by mesoscale ascent. From a thermodynamic perspective, a warm moist tongue over the NSCS is strengthened by the LLJ-driven mesoscale ascent as well as by a high sea surface temperature. The warm moist tongue farther extends northeastward by horizontal transport and arrives at the coast where CI and UCG occur.

Through conducting dynamic and thermodynamic diagnoses as well as a series of numerical sensitivity simulations, we further investigated the effects of the terrain, coastline, and cold pools on CI and UCG. CI occurred at the vertex of the coastal concave mountain geometry as a combined result of coastal convergence, orographic lifting, and mesoscale ascent driven by the terminus of a LLJ. In numerical simulations with the coastline or terrain of South China removed, the coastal CI does not occur or becomes weaker as the LLJ extends farther north. In addition, local small-scale terrain can modulate the detailed location and timing of CI and UCG. From a thermodynamic perspective, the coastal concave terrain plays the role of a local moisture ‘‘catcher’’, which promotes low-level moistening by blocking water vapor coming from an upstream moist tongue over the ocean. Furthermore, new convection is continuously generated by the lifting of low-level moist southerlies at the leading edges of cold pools that tend to move southeastward because of the blocking coastal mountains.