Chen, W.-T., C.-M. Wu, W.-M. Tsai, P.-J. Chen, and P.-Y. Chen, 2019: Role of coastal convection to moisture buildup during the South China Sea summer monsoon onset. *J. Meteor. Soc. Japan*, **97**, 1155-1171.
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Plain Language Summary: This study investigates the increase of ocean moisture and the occurrence of propagating coastal organized convection during the onset period of the South China Sea (SCS) summer monsoon. The long-term satellite observations and reanalysis are analyzed to derive the statistics of convection systems, moisture, and circulation. Idealized cloud-resolving simulations are carried out to study the response of moisture and convection to the low-level winds.

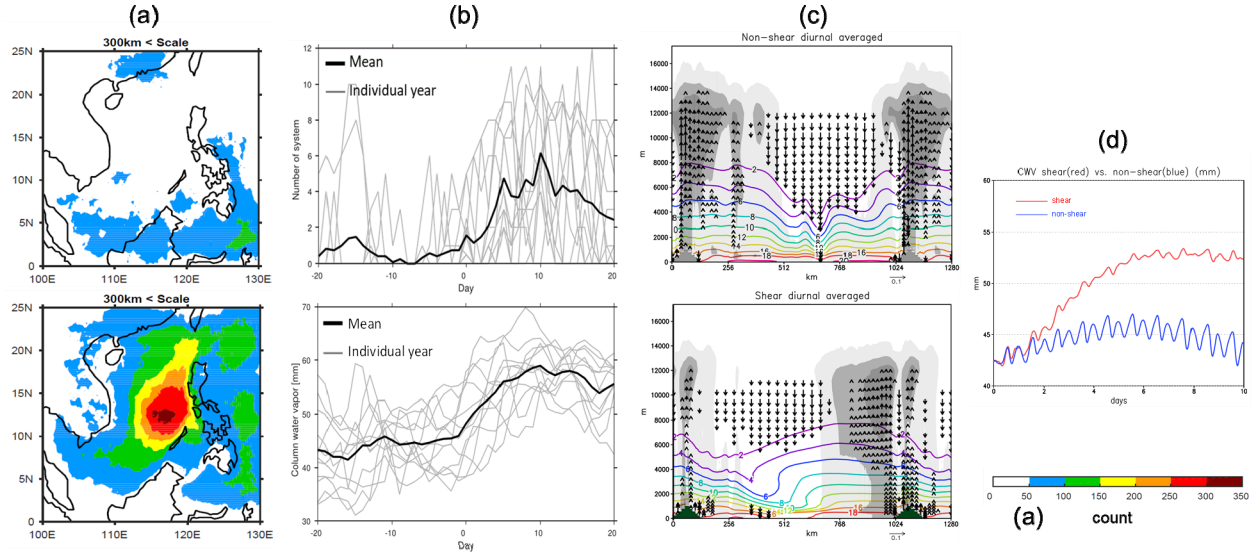

Figure 1. (a) Spatial distribution of the occurrence frequency of large precipitating systems (horizontal scale > 300 km) identified from satellite during the 20-day period before (top) and after (bottom) SCS monsoon onset. (b) Temporal evolution of observed large precipitating systems (top) and column-integrated moisture (bottom) over the SCS ocean during the +-20-day onset period in the typical activation years. (c) Zonal-vertical cross section of cloud fraction (grey shading), vertical velocity (vectors), and water vapor mixing ratio (contour) in the cloud-resolving simulations without (top) and with (bottom) low-level westerlies. (d) Simulated temporal evolution of column-integrated moisture over ocean without (blue) and with (red) low-level westerlies.

- Before the monsoon onset, an anomalous vertical circulation is developed over the SCS basin, with updrafts over land associated with the active diurnal convection and anomalous subsidence over ocean suppressing the precipitation.
- When the low-level winds switch to westerlies after the onset, the number of propagating organized convective systems increases over the Philippine coast, accompanied with fast ocean moistening within 5-10 days. The idealized simulations with a setting of land and ocean similar to the scale of the SCS capture these essential features of moisture and convection evolution.