Chen, Y. L., A. Q. Zhang, T. A. Liu, and W. B. Li, 2024: Diurnally propagating precipitation features caused by MCS activities during the pre-summer rainy season in South China. *J. Meteor. Soc. Japan*, **102**, http://doi.org/10.2151/jmsj.2024-019.

Plain Language Summary: The properties of mesoscale convective systems (MCSs) have huge impact on precipitation properties. Therefore, this study focused on the impact of MCS movement on precipitation characteristics during the pre-summer rainy season in South China. The results show that the directional movement of MCS do not only triggers the transmission of diurnal rainfall peaks, but also influences the ice-phased precipitation microphysics and precipitation intensity. We also suggest that the vertical structure of relative humidity, with moistest layer above boundary layer, plays a key role in MCS activities and thereby rainfall. We hope our results can contribute to the understanding and prediction of MCS-related precipitation over coastal regions.

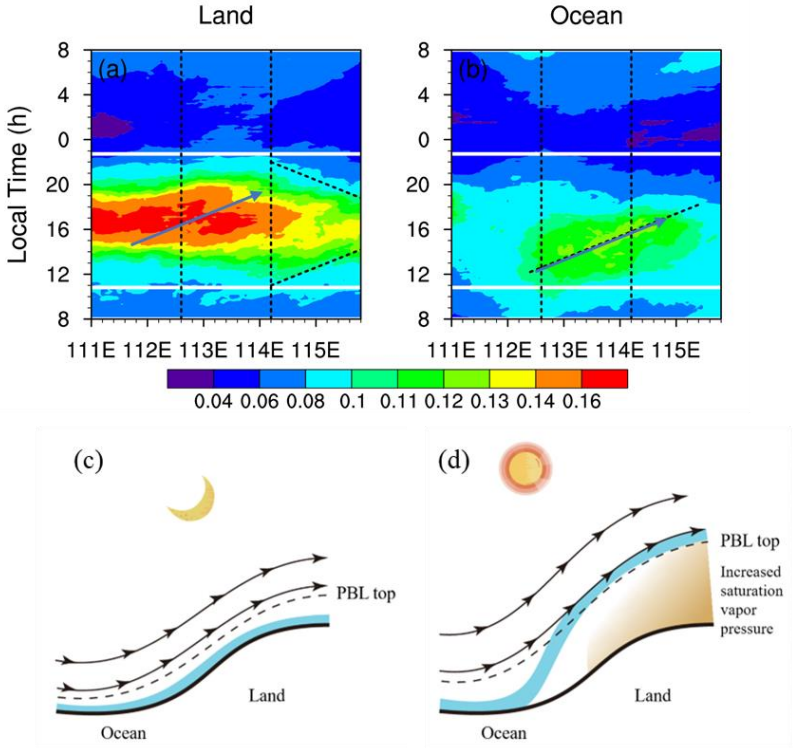

Figure 1. Diurnal variations of (a–b) MCS frequency averaged by latitude over the study regions, and conceptual models for the formation of vertically moistest layer (blue shadows) over the study region during (c) nighttime and (d) daytime. The solid arrows in (a–b) indicate the diurnally propagation of MCSs.

- The directional propagation of MCS triggers the transmission of diurnal rainfall peaks during the pre-summer rainy season in South China
- The propagation of MCS enhances ice-phased precipitation processes by spreading more droplets and therefore promotes near-surface rainfall
- The vertically moistest layer above planetary boundary layer plays a key role in the initiation and development of MCS