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Interactive comment on "The diurnal cycle of rainfall over New Guinea in convection-permitting WRF simulations" *by* M. E. E. Hassim et al.

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This paper is a highly significant numerical study of deep convection generated over New Guinea forming squall lines that propagate Northeastward during the suppressed phase of the Madden-Julian Oscillation (MJO). Moreover this is a truly timely venture: the Maritime Continent is in the process of being selected as a focal area for an international field campaign that involve individual scientists, the U.S. DOE ARM program (perhaps), and the WMO. The field campaign is in the process of being designed. This unique high-resolution series of simulations will be valuable both in its own right and for the honing the field campaign design. It is noted that the simulations reasonably agree with the TRMM measurements.

Squall lines propagating off the New Guinea highlands were observed during the MONEX field campaign conducted several decades ago. In a general sense this series of simulations are in agreement with these observations, and give a quantitative analysis of the mechanisms involved and, in particular, the diurnal cycle of precipitation.

Note that global weather models (global climate models in particular) are incapable of representing propagating convection and its its role in modulating the diurnal cycle of precipitation. The reasons are that the model resolution is insufficient to directly simulate the squall lines and the cumulus parameterization used in these models fail to represent organized dynamics. The latter was a highlight of the WCRP/WWRP-THORPEX Year(s) of Tropical Convection (YOTC) project correctly referred to in the manuscript.

The results reported in the manuscript are relevant to the findings of Mapes (1993) on offshore propagating systems that were based on with gravity-wave mechanisms. These results significantly extend the Mapes findings, e.g., by showing that the deep convection over the mountainous regions, together with coastal effects, rather than just the low-level heating over the elevated terrain, that governs the development and propagation of the squall lines and their subsequent vital effects on the diurnal cycle of precipitation.

Finally, the remarkably high standard of the figures go a long way towards explaining the complex physics and dynamics of the convective organization.

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