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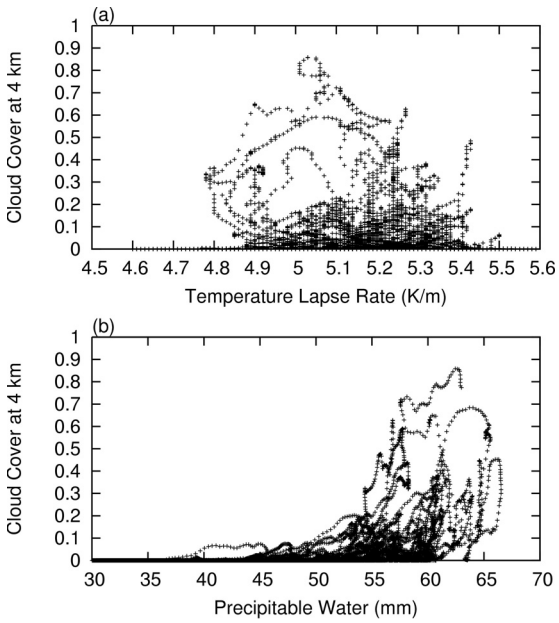

Fig. 1. The relationship of the cloud cover evaluated at the 4-km height in Domain 4 to (a) mean lower-tropospheric temperature lapse rate and (b) mean precipitable water vapor averaged over Domain 4.

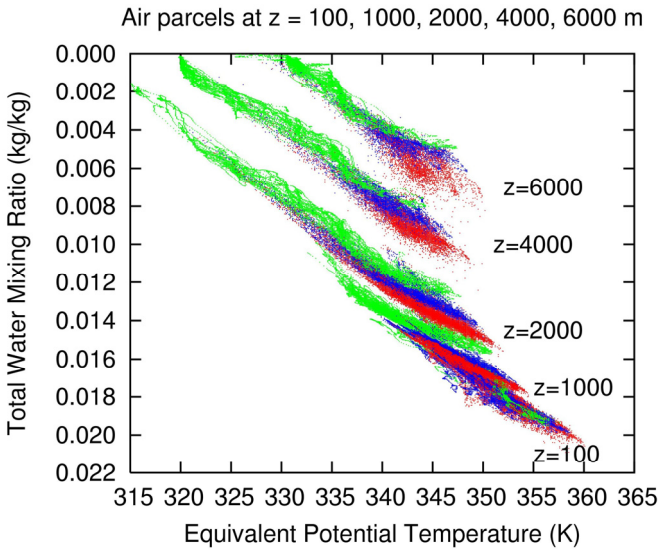

Fig. 2. Scatter plot of parcel properties at the heights of 100 m. 1000 m, 2000 m, 4000 m, and 6000 m in a conserved-variable space by equivalent potential temperature and total water (i.e., the sum of condensate and vapor) mixing ratio. Red, blue, and green dots denote the cloud-core parcels, the cloud parcels, and the environmental parcels.

- This study investigates the relationship between cumulus convection and environmental moisture in the tropical Indian Ocean by conducting convection-resolving simulations through the nesting capability with which the innermost domain has the 100-m grid resolution for the cases during the CINDY2011/DYNAMO period.
- The cloud cover whose tops exceed a middle level is shown to sharply increase with the increase in precipitable water vapor over about 55 mm. The increase in relative humidity in a lower layer results in the increase in cloud cover at a level above the humid layer.
- The existence of updraft cores that are less diluted with the environment is demonstrated, and contributes to the moistening of the environmental atmosphere. The updraft cores play a key role in the inter-relationship between cumulus convection and its environment, and are regarded as having a preconditioning influence for the convective initiation of MJO.