The Relationship Between Cloud And Rain Cells And The Role Of The Environment In Convective Processes During CHUVA-GoAmazon2014/5

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Convective processes in the Amazon region play an important role in the tropical and global atmosphere. The latent heat release by deep moist convection is an important energy source to large-scale tropical circulations, and features like convective intensity and position variations are important to define the weather and climate in the region. However, several questions are still open, such as the relationship between rain, cloud and the environment in which storm systems evolve. The atmospheric dynamics that drive the wind field affect rain and cloud cells in different ways. Moreover, the thermodynamic environment can impact new convective cell development and contribute to storm motion variability. The heating by latent heat release due to water phase changes in the clouds also can enhance convective processes and promote moisture convergence at low levels. This work explores the differences between cloud and rain cell features during the wet and dry seasons in the Amazon region; the role of wind, CAPE and latent heat release on convective processes; and how the environment features define rain and cloud cell propagation. We use observations made during the CHUVA and GoAmazon2014/5 field campaigns, including S-band and dual-polarization X-Band radar measurements, GOES satellite imagery and radiosonde data. The radar and satellite observations allow us to identify and track the rain and cloud cells by the Forecast and Track of Active Cloud Cluster (FORTRACC) technique. The differences between rain and cloud cell propagation are evaluated using complementary thermodynamic information. Case studies using wind divergence profiles computed from Doppler radar data are presented to describe the detailed behavior of the influence of the wind convergence and divergence as well as the latent heating in the propagation features. Finally, the wind and CAPE fields of the radiosonde data are used to analyze the environmental influence on convection propagation and on precipitating convective systems features.