Lightning activity on thunderstorms relative to the microphysics, thermodynamics and large-scale features in the Amazon Region

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Cloud-to-ground lightning activity in thunderstorms are related to several environmental features that accounts to their development: microphysics (changes in droplet size distributions due to pollution, which consequently changes the life cycle and ice particles formation), thermodynamics (local convection) and large-scale forcings (seasonal humidity conditions and motions configurations, such as the South Atlantic Convergence Zone, squall lines that propagate through the Amazon, Bolivian high). This study investigates the development of the thunderstorms and their lightning activity as observed by different weather radars during a wet and a transition from dry-to-wet season over the Amazon region. The thunderstorms are divided into life time duration and their radar parameters are correlated to the thermodynamics derived parameters measured with the radiosondes, topography, and large-scale features inferred from NCEP reanalysis. Furthermore, these thunderstorms are analyzed to depict the pollution influence of the forest fires occurred during the dry-to-wet season in order to identify any influence into the cloud droplets formation and life cycle.