

Land surface effects on deep convection within West African storms

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Characteristics of the land surface affect cloud development and growth through changes in heating and moistening of the lower troposphere, affecting convective stability and inducing mesoscale circulations in areas of differential heating. The partitioning of turbulent surface fluxes is closely tied to surface conditions such as vegetation cover and soil moisture, which can be heavily altered by humans via land use change. In West Africa, population increase has driven rapid changes in agricultural and urban land, in some places at the expense of rainforest. At the same time, the region is known to be a hotspot for land-atmosphere interactions that affect the development of intense expansive storms, so-called mesoscale convective systems, that often cause torrential downpours. Based on a combination of satellite observations and reanalysis data, we will evaluate the effect of soil moisture states and recent deforestation on the distribution and trends of such storms across the region. Finally, we will discuss why dry soils are responsible for storms getting more extreme and how we may use this knowledge for adaptation measures and improvement of nowcasting systems.