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CONVECTION IN AMAZONIA: what is the role of large clearings to enhance the rainfall?

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The Amazonia it is well know as a source of convection and it has a strong influence on the climate. Although this region is mainly covered by tropical forest, there is a high rate of deforestation for cattle activities and crop productions. For a microscale perspective, the presence of clearing of different dimensions/sizes can alter the energy budget at the surface producing a low level convergence and an increase of upward movement, thus originating clouds and rainfall. In order to study this problem, different approaches are been conducting: wind tunnel experiments were made with an apparatus design like a cavity (the height of the trees represented by H). The length of the clearing is a depression and its length can be represented by a multiple of H. These measurements were made for 3 different sizes (4H, 6H and 8H) and windspeed from 2 up to 10 m/s using PIV and HWA techniques. The results showed that the turbulence intensity, the wind profile and the turbulent kinetic energy are dependent from the dimensions of the clearings. Numerical modeling: the vertical structure of the turbulent fluxes was studied using a high resolution model (Large Eddy Simulation). The simulations started at 8 LT as the turbulent fluxes are positive and the unstable conditions are the dominant source of turbulence (free convection). They presented an intense release of surface sensible heat flux over the pasture site along the day, provoking a faster convective boundary layer development but a less energetic entrainment flux at the top in comparison with forest site. In situ Measurements: Recently, a joint experiment named GoAmazon and CHUVA Project were installed at Central Amazonia. This experiment (from January 2014 up to December 2015) has been settled in a large clearing area and its measurements (wind profile up to 200 m, radiosondes realesed 4 times/day, wind profiler and turbulent surface fluxes measurements by eddy correlation) are being analyzed and compared with the previous wind tunnel and numerical simulations results.