Title: Cloud modeling for Manaus region using OLAM

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Abstract

Manaus is a large city in the center of the Amazon rainforest. The GoAmazon field project is exploring the region through various data collection and modeling to investigate in impacts of the urban polluted plume on the surrounding pristine areas. In this study the Ocean Land Atmosphere Model (OLAM) was applied to simulate the atmospheric dynamics and the Cloud Condensation Nucleai (CCN) concentrations evolution for the period of the ACRIDICON field campaign that took place during September and October of 2014. Simulations with and without the urban plume was performed to identify its dynamics and local impacts. The results show that the land surface characteristics has important hole on the CCN distribution, clouds and rainfall formation over the region. At the south of Manaus the atmospheric dynamics is dominated by the cloud streets that are aligned with the trade winds and the Amazon River. At the north of Manaus, the Negro River produces the advection of a more stable atmosphere causing a higher CCN concentration on the boundary layer. Assuming a local high CCN concentration at the Manaus boundary layer region, the simulations show that the land-atmosphere interaction sets important dynamics on the plume. The model shows that the CCN plume moves along with the flow towards southwest of Manaus following the cloud streets and the river direction having the highest concentrations over the most stable water surface regions.

