MMM SEMINAR SERIES

Turbulence and gas transport within the Amazon forest: from flat terrain, to idealized ridges, to realistic (but simple) topography

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Turbulent fluxes of momentum, heat, water vapor, carbon dioxide, and forest emitted hydrocarbons play a major role in the coupling between the biosphere and the atmosphere. These fluxes are mediated by turbulent eddies that result from the complex interaction between the boundary-layer flow and the vegetation canopy. In tall and dense forests (such as the Amazon) eddies frequently penetrate the upper region of the forest but seldom reach the lower canopy, effectively separating the forest into two distinct regions with contrasting transport conditions. The resulting transport efficiencies are particularly important in the context of reactive gases emitted by the forest, as they can undergo significant chemical transformation before being transported out of the canopy region. Even gentle topography produces major effects in the flow field when covered by dense forests. In this talk I will use (some) observations and (lots of) results from high-fidelity idealized numerical simulations to study the transport of air parcels inside the Amazon forest canopy. In particular, I will quantify in-canopy residence times of air parcels and present a simple theoretical model to predict in-canopy chemical processing. I will also present simulations including gentle topography and discuss the potential effects of topography on transport and reaction of gases inside the canopy.

Thursday, 21 March 2019, 3:30pm

Refreshments 3:15pm

NCAR-Foothills Laboratory, 3450 Mitchell Lane, FL2-1022, Large Auditorium

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