MMM SEMINAR SERIES

Mesoscale & Microscale Meteorology
MMM LABORATORY

Turbulent flow over isolated forested hills of varying shape and steepness: influence on seed dispersal

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Due to the efficiency of forest canopies at absorbing momentum, buffering the underlying surface, and transpiring water accessed from deep soil layers, skill in predicting future climate requires accurate representation of the distribution of forests under evolving climate forcing. To represent forest evolution in future climates, NCAR's Community Earth Systems Model (CESM) incorporates the Functionally Assembled Terrestrial Ecosystem Simulator (FATES) model to predict future plant physiology, competition processes, ecosystem assembly and vegetation distribution. Many tree species rely on wind-driven seed dispersal to ensure their future livelihood. Forests also frequently reside in hilly terrain at the interface between ample water, light, and nutrients. Current models representing seed dispersal over forested hilly terrain are designed around flow over sinusoidally-repeating 2D hills, yet sinusoidally-repeating 2D hills rarely exist in nature.

In this talk we describe large-eddy simulations (LES) of turbulent flow over isolated 2D and 3D forested hills. We will briefly describe the model and the non-linear physics associated with adding a canopy to the hill flow. We then present an evaluation of the LES data against wind tunnel simulations over two axisymmetric hills of low and moderate steepness. Differences between flow over 2D and 3D hills will be emphasized. The talk will then close with an evaluation of current seed dispersal parameterizations against LES-derived seed dispersal over 2D and 3D forested hills.

Thursday, 7 March 2024, 2:00PM
Refreshments 1:45PM
Please also join colleagues for refreshments and informal discussion after the seminar until 3:30pm
NCAR-Foothills Laboratory, 3450 Mitchell Lane
FL2-1022, Large Auditorium
Seminar will also be live webcast
https://operations.ucar.edu/live-mmm
Participants may ask questions during the seminar via Slido.

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