Abstract Submitted
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Large Eddy Simulation of Pollen Transport in the Atmospheric Boundary Layer[1] MARCELO CHAMECKI, CHARLES MENEVEAU, Johns Hopkins University, MARC B. PARLANGE, Ecole Polytechnique Federal de Lausanne (EPFL) — The development of genetically modified crops and questions about cross-pollination and contamination of natural plant populations enhanced the importance of understanding wind dispersion of airborne pollen. The main objective of this work is to simulate the dispersal of pollen grains in the atmospheric surface layer using large eddy simulation. Pollen concentrations are simulated by an advection-diffusion equation including gravitational settling. Of great importance is the specification of the bottom boundary conditions characterizing the pollen source over the canopy and the deposition process everywhere else. The velocity field is discretized using a pseudospectral approach. However the application of the same discretization scheme to the pollen equation generates unphysical solutions (i.e. negative concentrations). The finite-volume bounded scheme SMART is used for the pollen equation. A conservative interpolation scheme to determine the velocity field on the finite volume surfaces was developed. The implementation is validated against field experiments of point source and area field releases of pollen.

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