

Abstract Submitted
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Parameterizing pollutant dispersion and deposition for roadside vegetation KHALED HASHAD, BO YANG, KE MAX ZHANG, Cornell University — With many communities living close to highways there is a need to mitigate traffic pollution. Roadside vegetation can be used to reduce pollutants by enhancing vertical dispersion and deposition. Most studies conduct either CFD simulations or field measurement to assess roadside vegetation. With growing interest to understand how roadside vegetation impact pollutant concentration, there is a need to develop simpler models that can describe this phenomena. We fit the Gaussian dispersion equations to describe pollutant concentration behind vegetation barriers through understanding the underlying physics driving pollutant dispersion and deposition. Vegetation induces drag on the flow and dissipates turbulence through its small structures like branches and leaves which creates a wake region with low velocity and turbulence. After the wake, the turbulence generated by the shear of the flow above the vegetation and in the wake, reaches the ground and further disperses the pollutants. A multi-region approach was used to describe the concentration behind the barrier. The first region is within the vegetation, followed by the wake region, then the high turbulence region. Data generated from LES simulations, validated through field measurements, was used to generate the model.

Khaled Hashad
Cornell University

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