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DNS and RANS Modeling of Dispersion in the Wake of an Obstacle DAVID PHILIPS, Stanford University, RICCARDO ROSSI, Universita di Bologna, GIANLUCA IACCARINO, Stanford University — We present a numerical study of the dispersion of a passive scalar in turbulent separated flows to establish the predictive capabilities of algebraic flux models against the standard eddy-diffusivity representation. The scalar dispersion from a point source over a wavy wall is initially investigated to carefully evaluate scalar flux models through comparisons with DNS data. The roof-top release of a passive plume from a wall-mounted cube in a turbulent boundary layer is then presented to demonstrate that algebraic models can also be applied successfully to atmospheric dispersion at street-scale. Despite the questionable validity of local-equilibrium conditions, the numerical experiments show that algebraic models provide a significant improvement for scalar dispersion simulations of complex flows with respect to the standard eddy-diffusivity model.

David Philips
Stanford University

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