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RANS modeling of scalar dispersion from localized sources within a simplified urban-area model RICCARDO ROSSI, STEFANO CAPRA, Università di Bologna, GIANLUCA IACCARINO, Stanford University — The dispersion of a passive scalar downstream a localized source within a simplified urban-like geometry is examined by means of RANS scalar flux models. The computations are conducted under conditions of neutral stability and for three different incoming wind directions (0° , 45° , 90°) at a roughness Reynolds number of $Ret = 391$. A Reynolds stress transport model is used to close the flow governing equations whereas both the standard eddy-diffusivity closure and algebraic flux models are employed to close the transport equation for the passive scalar. The comparison with a DNS database shows improved reliability from algebraic scalar flux models towards predicting both the mean concentration and the plume structure. Since algebraic flux models do not increase substantially the computational effort, the results indicate that the use of tensorial-diffusivity can be promising tool for dispersion simulations for the urban environment.

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