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Assessment of sub-grid scale dispersion closure with regularized deconvolution method in a particle-laden turbulent jet QING WANG, Stanford Univ, XINYU ZHAO, University of Connecticut, MATTHIAS IHME, Stanford Univ — Particle-laden turbulent flows are important in numerous industrial applications, such as spray combustion engines, solar energy collectors etc. It is of interests to study this type of flows numerically, especially using large-eddy simulations (LES). However, capturing the turbulence-particle interaction in LES remains challenging due to the insufficient representation of the effect of sub-grid scale (SGS) dispersion. In the present work, a closure technique for the SGS dispersion using regularized deconvolution method (RDM) is assessed. RDM was proposed as the closure for the SGS dispersion in a counterflow spray that is studied numerically using finite difference method on a structured mesh. A presumed form of LES filter is used in the simulations. In the present study, this technique has been extended to finite volume method with an unstructured mesh, where no presumption on the filter form is required. The method is applied to a series of particle-laden turbulent jets. Parametric analyses of the model performance are conducted for flows with different Stokes numbers and Reynolds numbers. The results from LES will be compared against experiments and direct numerical simulations (DNS).

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