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Dispersed phase effects on boundary layer turbulence[1] DAVID RICHTER, BRIAN HELGANS, University of Notre Dame — In natural and environmental settings, turbulence is often seeded with some sort of dispersed phase: dust, rain, snow, sediment, etc. Depending on the circumstances, elements of the dispersed phase can participate in both dynamic and thermodynamic coupling, thereby altering the turbulent transfer of heat, moisture, and momentum through several complex avenues. In this study, evaporating droplets are two-way coupled to turbulent wall-bounded flow via direct numerical simulation (DNS) and Lagrangian point particle tracking, and we are specifically interested in the wall-normal transport of momentum, heat, and moisture. Our studies show that particles can carry significant portions of all three, and that this is a strong function of the particle Stokes number. These findings are interpreted in the context of environmental flows and the practical implications will be discussed.

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