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Near-surface sea spray dynamics via simulations of particle-laden, turbulent Couette flow DAVID RICHTER, PETER SULLIVAN, National Center for Atmospheric Research — In the atmospheric surface layer situated over the air-sea interface, high winds can eject large amounts of sea spray into the turbulent flow above. The question of whether or not this dispersed phase within the turbulent surface layer can alter momentum transfer from the air to the ocean surface remains unresolved. This study, therefore, aims to identify and explain modifications of wall-normal momentum transfer in a turbulent, particle-laden flow. This is done using direct numerical simulation (DNS) with a Lagrangian point-particle representation of the dispersed phase. Turbulent Couette flow, chosen since it exhibits certain features similar to the atmospheric surface layer, is investigated with varying concentrations and sizes of spherical, non-interacting particles. Generally speaking, the addition of a dispersed phase disrupts the motions responsible for turbulent, carrier-phase momentum transfer, while at the same time compensating for this loss of momentum transfer through an additional dispersed phase stress. Mechanisms and interpretations of these changes in turbulent wall-normal momentum transport will be presented.

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