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**Settling of inertial particles through quiescent, weakly turbulent and strongly turbulent air** ALEC PETERSEN, DOUGLAS CARTER, LUCI BAKER, FILIPPO COLETTI, University of Minnesota — The fall speed of inertial particles suspended in a turbulent flow is an important parameter for numerous industrial applications and natural phenomena. Although this behavior has been subject to various investigations, precisely how the presence and strength of turbulent fluctuations affect the settling process is difficult to assess. Previous studies have provided several mechanisms which may either hinder or enhance the settling rate, but comparisons between them often show qualitative and quantitative discrepancies. We experimentally study the case of a suspension of size-selected microscopic particles falling through air. The mass fraction of the particles is low enough to neglect their influence on the fluid. Using randomly actuated jets of adjustable intensity, we gradually increase the mean velocity fluctuations of the air without introducing a significant mean flow. Because the integral length scale is kept approximately constant, the Kolmogorov scales become progressively smaller as the Reynolds number increases. We measure the average and fluctuating settling velocities for the different cases, and discuss the compatibility of our observations with the various proposed mechanisms of settling alteration by turbulence.

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