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On Parameterizing Turbulence in the Stably Stratified Atmospheric Boundary Layer[1] JORDAN M. WILSON, SUBHAS K. VENAYAGAMOORTHY, Colorado State University — Parameterizing turbulent mixing in the stably stratified atmospheric boundary layer remains an active area of research connecting available field measurements with appropriate model parameters. The research presented studies the pertinent mixing lengths for shear- and buoyancy-dominated (or weakly stable and very stable) regimes in the stable atmospheric boundary layer (SABL). Incorporating shear and buoyancy effects, two length scales can be constructed, $L_{kS} = k^{1/2}/S$ and $L_{kN} = k^{1/2}/N$, respectively. Extending the conceptual framework of Mater & Venayagamoorthy (2014)[2], L_{kS} and L_{kN} are shown to be accurate representations of large-scale motions from which relevant model parameters are developed using observations from three field campaigns. An *a priori* analysis of large-eddy simulation (LES) data evaluates the efficacy of parameterizations applied to the vertical structure of the SABL. The results of this study provide a thorough evaluation of the pertinent mixing lengths in stably stratified turbulence through applications to atmospheric observations and numerical models for the boundary layer extendable to larger-scale weather prediction or global circulation models.

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[2]*Phys. Fluids*, 26(3), 036601.

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