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A simple alternative to K-theory in the stable boundary layer

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Arguments are presented in favour of an alternative to an eddy-viscosity approach (K-theory) in stable stratification. These arguments suggest rather a drag coefficient formulation which is to be applied as a function of the bulk Richardson number throughout the boundary layer. Traditionally, application of the drag coefficient has been confined to the surface layer. Here it is demonstrated that the drag coefficient approach gives good agreement with both on- (CASES-99) and offshore (FINO1) measurements. The approach is simple in that it reduces to a single analytical equation for the resultant wind speed tendency. This is then implemented into the Weather Research and Forecasting model where an improved calculation of wind speed over the existing eddy viscosity approach is shown, particularly with regards to low level jets.