Direct Simulation of the Turbulent Ekman Layer: Evaluation of Closure Models SCOTT WAGGY, STUART MARLATT, SEDAT BIRINGEN, University of Colorado at Boulder — A direct numerical simulation (DNS) at a Reynolds number of 400 was performed for the atmospheric boundary layer (ABL) using an Ekman layer approximation. Turbulence energy budgets show that these simulations are pertinent to the ABL. First-order closure models also compared well with the DNS results as the general distribution of the eddy diffusivity was captured correctly for both the neutral Ekman layer as well as the stably-capped Ekman-layer. This led to the conclusion that the vertical profile of the eddy diffusivity can be accurately represented by a cubic polynomial as is done in both first-order closure models.

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Date submitted: 05 Aug 2009   Electronic form version 1.4