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# Application of large eddy simulations for the parameterization of stable atmospheric boundary layer

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Authors investigated the parameter space of the stable atmospheric boundary layer by varying geostrophic winds, surface cooling rates and special/temporal resolutions using the large eddy simulations. The NCAR LES model based on a mixed pseudo-spectral finite difference method with third-order Runge-Kutta time stepping utilizing a staggered vertical grid and Smagorinsky subgrid-scale eddy viscosity model and PArallelized Les Model (PALM) based on a central finite differences method with a Cartesian staggered grid and turbulent kinetic energy (TKE) model were used and compared. The basic structure of the potential temperature, winds, stochastic turbulent profile and TKE budget were analyzed and the vortical structure with horizontal layering in the stable atmospheric boundary layer was investigated. Based on these results, authors validated the state-of-the-art k-profile planetary boundary layer parameterization schemes of the global numerical weather prediction models. Han and Pan (2011), Lock et al. (2000) and YSU (Hong 2010) schemes are evaluated.