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Evaluation of PBL Parameterization schemes based on Large-eddy Simulation

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The performance of two PBL schemes (YSU and MYJ) is evaluated by the large-eddy simulation (LES) within the same three-dimensional ARW dynamic framework. The model is initialized with a horizontally homogeneous sounding data set upon which a specified diurnal heat flux forcing and radiative cooling rateare imposed. The unique aspects in the approach are the employment of large-eddy simulations as a benchmark and highly idealized experimental design. Our approach is much easier to isolate the errors associated with a particular physical parameterization tested than that by using real-data simulation. Analysis s of potential temperature and water vapor mixing ratio suggests that YSU over-predicts the mixing showing a higher PBL top with warmer, drier PBL structure than those from the LES, and MYJ under-predicts the mixing having a lower PBL top with colder, moister PBL structure.