

Simulation of atmospheric boundary layers using WRF-LES model

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WRF (Weather Research and Forecasting) model uses nesting that can be repeated down to turbulence solving large eddy simulation (LES) scales, providing a means for significant improvements of simulation of turbulent atmospheric boundary layers. Large Eddy Simulation (LES) of atmospheric flows requires modelling of subfilter scale (SFS) stresses. The Smagorinsky and TKE SFS models used in WRF both use constants that cannot be generalized to work well across different grid resolutions, and predict incorrect near-wall behaviour. Dynamic SFS models, on the other hand, do not have any adjustable constants, hence are more general. In this study, the recently implemented scale-dependent Lagrangian dynamic SFS model and the dynamic reconstruction SFS model in WRF-LES are tested in simulating atmospheric boundary layers under different stability conditions.