EMS7/ECAM8 Abstracts,
Vol. 4, EMS2007-A-00186, 2007
7th EMS Annual Meeting / 8th ECAM

Challenges of large-eddy simulation applications to complex PBLs

C.-H. Moeng
NCAR

The most advanced numerical tool today for studying geophysical turbulence is the Large-Eddy Simulation (LES) technique. LES explicitly simulates large turbulent eddies that carry most of the turbulent kinetic energy and are responsible for most of the turbulent transport. This technique has been used in the PBL (Planetary Boundary Layer) community to examine physical processes and turbulent flow structure, and to generate benchmarks for calibrating or evaluating PBL parameterizations used in climate or weather forecasting models.

However, most LES applications for the PBL have been limited to PBLs over horizontally uniform surfaces or idealized strip-like heterogeneous surfaces where periodic boundary conditions can be applied in the horizontal directions of the numerical domain. The future challenge is to extend LES applications to real-world PBLs over complex terrain, land use, ocean waves, and also to include interactions of turbulence with mesoscale, weather events and deep clouds.

In this talk I will discuss issues and challenges of LES applications to complex PBLs and propose a step-by-step approach towards these challenges.