CNRM, UMR 3589

SEMINAIRE CNRM

N° 2018_08

jeudi 21 juin 2018 à 14h

COMMENT LES DONNEES HAUTES RESOLUTIONS PEUVENT NOUS PERMETTRE D'AMELIORER LA REPRESENTATION DE LA TURBULENCE ET DE LA CONVECTION ?

par Pierre GENTINE
(Columbia University)

en salle Joël Noilhan

Résumé :

Recent advances in computational capacities have permitted to obtain geophysical fluid dynamics simulations at unprecedented resolutions.
I will present two examples where higher resolution simulations can be used to develop new parameterizations (convection) and to test existing theories (Monin-Obukhov Similarity Theory). I will also present examples where current computational resolutions are insufficient (very stable boundary layer).
In the first example we will show that convective permitting simulations can be used to develop efficient convection parameterizations, which alleviate many of the biases present in regular parameterizations (e.g., precipitation extremes or wave propagation).
In a second example we will show that Direct Numerical Simulations (DNS) can now be used to test some basic theories such as Monin-Obukhov Similarity Theory (MOST) and Townsend's (wall attached) eddy's hypothesis. In particular we will show the fundamental role of the outer layer (scaling) on the surface layer, especially in convective cases, which is missing in MOST.
Finally, I will present an example where numerical simulations are still far from reality: In the very stable boundary layer case the range of eddy sizes is just way too large for current numerical simulations so that LES and DNS cannot fully resolve the important scales (Ozmidov or energy containing scale) and are systematically deficient."

Pour tout renseignement, contacter Y. Poirier (05 61 07 96 55) ou J.L. Sportouch (05 61 07 93 63)
Centre National de Recherches Météorologiques
42, Avenue G. Coriolis - 31057 Toulouse Cedex