

Chantal Staquet : « Comparaison de modèles 1D pour la couche limite stratifiée sur sol plat »

*Our work is devoted to the numerical modelling of the stable atmospheric boundary layer. The main goal is to improve turbulence models currently implemented in weather forecast research models. These turbulence models consist in expressing the Reynolds stresses as a function of the mean fields (horizontal velocity components and potential temperature) using closure assumptions. We study in detail two different turbulence models for the stable atmospheric boundary layer, based on different assumptions: the so-called TKE-I scheme (Mellor-Yamada,1982), which is used in the BOLAM (Bologna Limited Area Model) forecast model, and a recent model developed by Mauritsen et al. (2007). These turbulence models have been included in a Single Column Model (SCM) of the atmospheric boundary layer to test their predictions without any other influence. The comparison is made on the test-case "GABLS1", which is well-documented in the literature. To assess the validity of these predictions, a three-dimensional dataset has been created using Large Eddy Simulations (LES) of the GABLS1 test-case. The ARPS (Advanced Regional Prediction System) code is used for this purpose. The stable stratification constrains the grid size so that the LES should be of high enough resolution for the typical vertical scale of the motion to be properly resolved. Comparison of this dataset with the predictions of the turbulence models will allow for proposing a set of new closure assumptions to improve the BOLAM turbulence model.*