Second order closure turbulence models have been widely used to simulate the planetary boundary layer (PBL).

Stably stratified flows characterize by smaller eddies, and thus a local approximation may be more justified. In such flows, one has two competing factors: a shear that acts as a source of mixing and a stable temperature gradient that acts as a sink. This 2 factors could be combined into a single parameter, the Richardson number (Ri).

The second order closure turbulence models that are Richardson number dependent such as Mellor-Yamada 82 model yields critical Richardson number Ri(cr) = 0.19. Recently this critical value increase to Ri(cr) = O(1). Several studies show that persistence of turbulent character for Ri > 1 and even an Ri(cr) ≈ 1 is not satisfactory. To deal with this limitation, Canuto introduced a Second order closure turbulence model that didn’t have dependency to critical Richardson number. This model is an improve version of Mellor and Yamada and also his own model introduced earlier. To compare the results of this model, the LES GABLS data and the real data have been tested. The real data are those collected by Heinman in arctic area in 2002.

The initial data are mean horizontal velocity and potential temperature. Output data are turbulent flux terms, Richardson number, and the height of boundary layer.

Results show agreements with the previous numerical experiments that have already been presented. In some situations the results are not consistent. The results show that new model has more exact and precise results.