Evaluation of the standard k-ϵ closure scheme for modeling stably stratified wall-bounded turbulence[1] AMRAPALLI GARANAIK, FARID KARIMPOUR, SUBHAS VENAYAGAMOORTHY, Colorado State University — Reynolds-averaged Navier-Stokes (RANS) turbulence models are widely used for modeling stratified turbulent flows. The focus of this study is to account for the effect of the buoyancy forces in the two-equation standard k-ϵ closure scheme for modeling stably stratified wall-bounded turbulence. The buoyancy parameter ($C_{\epsilon 3}$) is analytically revisited and it is found that it can be neglected in the evolution equation of the dissipation rate of the turbulent kinetic energy. Furthermore, we use different propositions for the turbulent Prandtl number (Pr_t) to assess their efficacy for modeling stratified wall-bounded flows. Numerical simulations are implemented in a 1-D water column model and the results are compared with data of direct numerical simulation of stably stratified channel flow.

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