On the "do-something" boundary condition for incompressible convection dominated flows

Tomáš Bodnár

Czech Technical University in Prague, Czech Republic
Tomas.Bodnar@fs.cvut.cz

This numerical study presents the results of simulations of stably stratified wall-bounded flows. The effect of artificial far-field boundary conditions is studied in detail. The standard homogeneous Neumann condition for pressure is replaced by a non-homogeneous "do-something" condition depending on local velocity and its gradient. The numerical tests are performed for the case of flow over a low isolated hill. The simulations on computational domains with three different heights are discussed to evaluate the performance of the new far-field artificial boundary condition. The model is based on Boussinesq approximation of non-homogeneous Navier-Stokes equations, solved using artificial compressibility method, looking for a steady solution. The in-house developed finite-difference and finite volume codes were used on structured grid.

This is a joint work with Philippe Fraunié from the University of Toulon, France.

References

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