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The internal energy rate of change in a deep moist convective process

E. Fiori (1), A. Parodi (1) and F. Siccardi (1,2)

(1) CIMA, University of Genoa, Savona, Italy (2) DIST, University of Genoa, Genoa, Italy

Many numerical Limited Area Models are reported to be quite unreliable in predicting rainfall depth at small time and space scale. Properties of a deep moist convective process in a simplified atmospheric scenario are numerically investigated. The usually adopted turbulent closure effects are compared to microphysics schemes effects to assess the rate of change of specific internal energy and kinetic energy.

The study is conducted by the use of simulations obtained with COSMO Model for a high resolution numerical simulation of a supercell. Different turbulent closure schemes and different grid spacing, from 1 km to 250 m, are used to identify possible changes in precipitation amount, size and strength of the structures and to evaluate if it is possible to identify a scale under which convection-resolving solutions converge from a turbulence perspective with respect to flow field structure and microphysical processes.