

Numerical experiments of structure of convective plumes using a 3-dimensional nonhydrostatic model

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The structure of convective plumes for open water deep convection is studied by using a nonhydrostatic numerical model. The 160 experiments are conducted by using a different physical parameters, such as Colioris parameter, diffusivity and surface bouyancy flux. A separation curve, instead of a line previously proposed, between two dimensional (2-D) and three dimensional (3-D) regimes of convection is estimated in a parameter space. In the 2-D regimes, a new structure, which is referred to as mushroom structure, has been founded. In contract to the already-known heton structure consisting of a quasi-stable vortex pair, a temporal development is essential for a mushroom structure.