NUMERICAL SIMULATION OF A PASSIVE POLLUTANT IN A HIGHLY CONVECTIVE BOUNDARY LAYER USING LARGE EDDY SIMULATION MODEL

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This work describes the time evolution of three-dimensional structure of an inert and passive atmospheric pollutant, continuously emitted by a line source located at surface, in a highly convective Planetary Boundary Layer (PBL). The PBL properties were numerically simulated using a large eddy simulation model. The quasi-steady equilibrium is determined by following the time evolution of turbulent kinetic energy averaged over the entire PBL. Under equilibrium conditions, the vertical structure of pollutant concentration, potential temperature, associated vertical turbulent fluxes and variances are consistent with the Mixed Layer Similarity predictions. The vertical wind component skewness is positive indicating that the updrafts are more intense and localized than the downdrafts. The instantaneous spatial distribution of pollutant is closed related to this asymmetry.