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Numerical simulations of tornadoes in complex urban landscape

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Current mesoscale models produce large errors near steep boundaries, due to the use of terrain-following coordinates to treat to solve that problem and allow for use of higher resolution terrain. In this study, the flow of a tornado in a complex urban area was numerically examined by coupling a the CFD model Fluent with the Bryan Cloud Model (CM1). An intense vortex in CM1 by forcing an updraft co-located with a Rankine vortex. Once it becomes a nearly steady-state tornado (approximately 65 m s-1), the output fields are used to provide initial and boundary conditions for the Fluent simulation. Preliminary simulations of tornadoes moving on a urban skyline are compared to the evolution without any buildings.