

## Authors response to reports

### Report 2

- As a minor addition, it would be useful to include temperature and relative humidity profiles in the simulation, as both strongly influence the partitioning of semivolatile compounds. We thank the referee for their recommendation. Correspondingly, we have inserted a new subsection “3.1 Environmental Conditions” in which we include figures characterizing the vertical profile of temperature and relative humidity throughout simulations. We raise an important nuance in contextualizing these findings; although warming and drying are observed during simulations, continued emission of semi-volatile compounds and primary aerosol mean the formation of condensed phase species (e.g., ammonium nitrate) will still be favored for high emissions heterogeneity scenarios. In addressing the referee comments, we have chosen to provide additional clarification on the source of meteorological initial conditions in Section 2.2, indicating that initial conditions are adapted from the base sounding profile packaged alongside WRF’s LES test case. Furthermore, an error was identified in the number of vertical levels mentioned in the computational domain; the domain contains 100 vertical levels, not 200. The quoted vertical resolution was correspondingly updated from 10 m to 20 m.