Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2020-782-RC1, 2021

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Diurnal evolution of total column and surface atmospheric ammonia in the megacity of Paris, France, during an intense springtime pollution episode" *by* Rebecca D. Kutzner et al.

Anonymous Referee #2

Received and published: 18 February 2021

This paper investigates ammonia diurnal variability near surface as well as in the tropospheric column over the megacity of Paris in spring 2012 during an intensive pollution episode and shows significant differences between them. The observations are analyzed in conjunction with particulate matter levels and meteorological parameters and the differences are explained by the dilution within the boundary layer and also by volatilization of ammonium nitrate particles. The study is interesting and contributes to the understanding of ammonia variability in the atmosphere. The manuscript is overall nicely written; however, some clarifications and corrections are needed before publica-

tion in ACP.

Line 382-384: This sentence is misleading. 'higher altitudes' needs definition because Fig 6. shows that this anti-correlation between RH and Temp is limited to the first 1000 or 1500 m.

Line 235: Please provide further information on the model version you are using is it running off-line and if yes with what meteorological parameters. Are the CHIMERE simulations associated with ERA-Interim meteorology mentioned in lines 238-342 to be used to analyze the meteorological conditions?

Line 237: The reference you provide is an entire textbook. Please be specific. Which thermodynamic model is used in that simulation. (Unfortunately, the web site provided for the model in line 234 requires password, so it seems to be useless for the reader. I suggest removing it.)

Line 372: ISORROPIA reference is Nenes et al. 1998; ISORROPIA II reference should be Fountoukis and Nenes, ACP, 2007 please correct accordingly. Also, in which form ISORROPIA was run (forward) or backward? What input data have been used? Information on how the ISORROPIA (or ISORROPIA II) simulations are done is missing and will affect any results of the model, although in the paper such results are discussed only qualitatively.

Line 354-355: figure 6a shows temperature profile up to 2.5km, the reference to the tropopause level is misleading, rephrasing is needed.

Line 285: the discussed PM2.5 levels are the results of simulations or observations ? do in-situ observations show similar levels?

Line 577-580: Does your model reproduce such behavior during night? The model results need to be discussed more and valorized. Does the model reproduces observed surface and profiles of NH3? The reader remains with the question why not comparing the model results to the observations?

Line 241-242: Provide temporal resolution. Are these data used as input to Chimere model?

Line 132: particulate matter

Line 211: the following

Line 297: homogeneous

Line 375: decreasing ammonia

Lines 507-508: 'depicts... depicting.. the last one...' (which one?), please rephrase the sentence.

Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2020-782, 2020.