Response to Comments by Reviewer 1

The article "A Diagnostic Intercomparison of Modeled Ozone Dry Deposition Over North America and Europe using AQMEII4 Regional-Scale Simulations" by Hogrefe et al. is another of the Air Quality Model Evaluation International Initiative model comparisons, this one focused on dry deposition of ozone. The paper analyzes the ozone dry deposition fluxes and velocities from simulations over North America and Europe for 12 different model configurations. The article is well written and presented and should be published with only very minor revisions. In fact, this reviewer had a difficult time finding much of anything to comment on. Corrections or suggestions for minor improvements are listed below.

Response: We would like to thank the reviewer for the positive assessment of our manuscript and the helpful list of corrections and suggestions for improving the manuscript. In the sections below, reviewer comments are shown in regular black font, our responses to reviewer comments are shown in italicized black font, and key changes incorporated into the revised manuscript to address the reviewer's comments are shown in regular blue font.

Comment: Throughout the article there are several places where "O3" occurs rather than the "O_3".

Response: This has been corrected in the revised manuscript.

Comment: p. 3, line 75: "A companion paper in this issue .." ... I believe this refers to the previously cited Schwede et al., 2018, but it might also refer to a companion paper in the current issue. This ambiguity should be resolved.

Response: This statement referred to Makar et al. (2025) which was cited at the end of the sentence. To make this clearer, the reference has been moved towards the beginning of the sentence:

Modification to the manuscript text:

"A companion paper in this issue (Makar et al., 2025) showed …"

Comment: p. 17, line312: should be "... averaged over only those grid cells **where** a given model ..."

Response: This has been corrected in the revised manuscript.

Comment: pp. 22-24: The discussion here concerning Figure 10 is somewhat confusing because of the shorthand names given to the regional-scale simulation results vs the single point model results. For example, on p. 22, lines 369-370, single point models are referred to as "GEM-MACH Zhang" and "GEM-MACH Wesely", while in Figure 10 these models are labeled "SP GM Zhang BF/SP GM Zhang HF" and "SP GM Wesely BF/SP GM Wesely HF". Some additional thought should be given to making the names more consistent between the text and Figure 10.

Response: Thank you for pointing out that the abbreviated labels used for the single point model results in Figure 10 and the corresponding Figures in the SI made it harder to follow the discussion in the text. While we opted to retain these label abbreviations in the revised manuscript because spelling out the full names in all labels (such as "Single Point GEM-MACH Wesely Harvard Forest") would make the actual bars too small, we added text to list all abbreviations used in the Figure labels. All of these abbreviations are also listed in the Figure captions and we added a note to the text to explicitly refer the reader to these captions, such as this caption for Figure 10:

> *"Summer and winter effective conductances and ozone deposition velocities calculated by the grid models for mixed forest grid cells and calculated by the corresponding subset of single point*

(SP) models analyzed in Clifton et al. (2023) at the Borden Forest (BF) and Harvard Forest (HF) sites. The bars for the SP models are overlayed on grey boxes to visually distinguish them from the bars representing grid models. In the x-axis labels, results for the SP GEM-MACH Wesely and Zhang simulations are shown as "SP GM Wesely" and "SP GM Zhang", respectively, while results for the SP WRF-Chem Wesely simulations are shown as "SP WC Wesely". The mixed forest grid cells selected for this analysis are those in which a given model had at least 85% coverage for this LU category. The number of these grid cells differs across models due to underlying differences in LU (see Section 3.3)"

Modification to the manuscript text:

"In these Figures, bars showing the single point model results from Clifton are prefixed with the label "SP" to more easily distinguish them from bars showing the grid model results. The point model labels also use abbreviations for GEM-MACH and WRF-Chem as noted in the Figure caption."

Comment: p. 36, line 587: should be "between 0.4 and 1.0 cm s^{-1} ..." (i.e., superscript "-1").

Response: This has been corrected in the revised manuscript.

Comment: Section " 4 Summary": The authors have done an excellent job of disentangling the effects of different LU types and LU datasets on the deposition results in this work. However, given the importance of the underlying LU data, I would think a general call for improved, commonly available high-resolution LU datasets would be appropriate. With the plethora of satellite datasets available today, a concerted effort to create better, publicly available LU datasets would reap significant benefits for air quality, weather and land surface models.

Response: Thank you for the positive assessment of the LU-focused portion of our manuscript. We agree with the sentiment expressed in this comment and added the sentence copied below to the end of the Summary.

Modification to the manuscript text:

"In addition, such future harmonization efforts should utilize current generation publicly available high resolution LU datasets to improve upon some of the currently used datasets that date back more than a decade, and would also benefit from close collaboration with the LSM community."

Comment: Figures S12 an S13 in the supplement are of very poor quality and should be improved.

Response: These Figures have been replaced with higher resolution versions. Please note that due to the addition of two more Figures to the supplement, these Figures are now S14 – S15.