

Interactive comment on “3-D evaluation of tropospheric ozone simulations by an ensemble of regional Chemistry Transport Model” by D. Zyryanov et al.

Anonymous Referee #1

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The manuscript focuses on an important topic, namely the evaluation of vertical ozone distributions predicted by various regional chemistry transport models (CTMs). The combined use MOZAIC and IASI data for this purpose is novel, and the authors present a comprehensive analysis of the observed and modeled datasets. I find the manuscript to be well structured and only have a number of minor, mostly editorial, comments.

Abstract: Please spell out all acronyms. For the discussion on lines 1-10, I suggest briefly stating that four of the five regional CTMs used the MOZART IFS boundary conditions, while the remaining CTM (MOCAGE) used a different set of boundary conditions. Regarding the statement on lines 14-15, I suggest stating that the explicit com-

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parison of the impacts from using 3-hourly vs. monthly mean boundary conditions was performed with only one (CHIMERE) of the four regional models using MOZART-IFS boundary conditions. In line 15, please be more explicit about what metric was used to determine improved model skill. In line 18, please replace “caught” with “represented”

Page 28,800, line 1: suggest rephrasing “. . . implies the need for identifying and reducing . . .”

Page 28,800. Lines 5-6: suggest “. . . performance . . . has been less evaluated” instead of “. . . performances . . . have been less evaluated”

Page 28,801, line 9: typo: please change “. . .forecast pollutants concentrations” to “. . .forecast pollutant concentrations”

Page 28,801, line 13: suggest “. . . (such as bias, RMSE, etc.)” instead of “. . . (such as bias, RMSE, . . .)”

Page 28,801, line 15/16: suggest “However, . . .” instead of “On the contrary, . . .”

Page 28,801, line 18: please remove “is” after “it is proposed here”

Page 28,801, line 23: suggest rewording “. . . will be compared against . . .” instead of “. . . will be confronted to . . .”

Page 28,802, line 5: please replace “. . .participating to . . .” with “. . .participating in . . .”

Page 28,802, line 6: suggest removing parenthesis

Page 28,803, line 12: please remove “the” between “and” and “rather fine spectral resolution”

Page 28,803, line 21: please use upper case for “Transfer”

Page 28,805, line 6: please change “participate to this exercise” to “participate in this exercise”

Page 28,806, lines 17-18: CAMx model top at 300 hPa is below, not above 200 hPa. I

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would suggest explicitly listing the vertical top for all models here.

Page 28,806, lines 20-22: I would suggest rearranging the sentence as follows: "In order to have a common reference frame for comparison, daily concentration have been interpolated onto a horizontal 0.5 x 0.5 lat/lon grid (Fig. 1) and a regular spaced vertical grid ranging from 0 km to 12 km in 1 km increments"

Page 28,807, line 8: please replace "confrontation" with "comparison"

Page 28,807, line 10: suggest replacing "is also completed" with "further contains"

Page 28,807, line 20: suggest replacing "revealed" with "were found to be"

Page 28,807, line 27 – Page 28,808, line 1: suggest removing "by construction"

Page 28,808, line 4: Please provide more details on the "unsatisfying results". Could they also have been caused by the low model top used by CAMx (300 mb)?

Page 28,808, line 18: please remove "the" after "concerning"

Page 28,809, lines 1-23: could lightning NOx also play a role in this underprediction? How was it handled by the regional CTMs?

Page 28,810, line 28: please replace "associate to" by "associate with"

Page 28,811, lines 2-4: I am not sure I follow the argument about the increased variability. Could you please elaborate and define variability in this context?

Page 28,811, lines 19-20: please replace "... " by "etc."

Page 28,812, line 16: please replace the second "either" by "or"

Page 28,812, line 26: please remove "can"

Page 28,812, line 28: please change "follows" to "follow"

Page 28,814, line 23: suggest changing "work" by "study"

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Page 28,815, line 2: please remove "and" before "which are strongly"

Page 28,815, line 5: suggest replacing "state" by "find"

Page 28,815, line 24-26: does the statement "which makes it necessary to dispose of simulations also above 6 km" refer to all models or only CAMx?

Page 28,816, line 13: Please remove "since" at the end of the sentence

Page 28,817, line 9: please insert "were" between "columns" and "calculated"

Page 28,818, line 18: please replace "one's" by "evolution"

Page 28,818, line 20: please replace "quarters" by "quadrants"

Page 28,819, line 13: please replace "probably" by "likely"

Page 28,819, lines 26-29: Please elaborate.

Page 28,820, line 4: please replace "especially" by "In particular"

Page 28,822, line 16: please replace "participated to" by "participated in"

Page 28,822, line 20: suggest avoiding subjective statements like "appears to be satisfying" and only provide the quantitative information (bias, RMSE, correlation) instead.

Page 28,823, line 5: please replace "revealed" by "was found to be"

Page 28,824, line 1: please rephrase "... confront models to satellite data, especially ..." by "compare models against satellite data, in particular ..."

Page 28,824, line 6. Please remove "both".

Page 28,827, line 7: suggest avoiding subjective statements like "generally satisfying"

Page 28,827, line 7: please replace "especially" by "In particular"

Page 28,827, line 12: please insert "over" after "averaged"

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Page 28,837, Table 3 caption: typo “Pearseon’s”; Also suggest removing “corresponding” at the beginning of the last sentence.

Page 28,838, Table 4 caption: rephrase “the simulation has been divided into 4 quarters” by “the domain has been divided into four quadrants” (or sub-regions)

Page 28,839, Figure 1 caption: please replace “in the frame of the MOZAIC . . .” by “under the framework of the MOZAIC . . .”. Please also add “are the” after “Also indicated”

Page 28,840, Figure 2: use decimal points rather than commas on the x-axis

Page 28,841, Figure 3: what were the metrics normalized with? Also, the caption says “. . . six models using IFS-MOZART at their boundaries” – weren’t there only five (BOLCHEM, CAMx, EURAD, and two CHIMERE simulations)?

Page 28,842, Figure 4 caption: please replace “with” by “from” after “the IASI columns were calculated”

Pages 28,844 – 28,845, Figures 6a-b. Please modify the labels from “summer.2008” to “Summer 2008” or something similar.

Page 28,448, Figure 9: The figure lacks a color scale and the labels are not readable.

Page 28,849, Figure 10 caption: The caption refers to a figure 10 presenting MOZAIC flights. I could not find this figure. Please check.

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