

Interactive comment on “BEATBOX: Background Error Analysis Testbed with Box Models” by Christoph Knote et al.

Anonymous Referee #2

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This paper describes the BEATBOX framework, which enables users to perform and asses several data assimilation techniques using the BOXMOX model. The tool is open-source and should be of high interest to the atmospheric chemistry community. The online examples provide appropriate guidance to reproduce the results presented here.

I have only minor concerns with the manuscript concerning clarity. There are a few sections that are difficult to follow, and could be corrected by including more details, simplifying sentences, or fixing typos. I recommend publication after addressing the points below.

Page 1, line 8: should be “allows users to conduct”

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Is Figure 1 referenced anywhere?

Page 5, line 17: Mention that BOXMOX is a standalone Linux executable (i.e. not written in python).

Page 6, section 2.1.2: The last sentences of each paragraph in this section are essentially the same. Include it only once.

Page 7: line 14: A single observation ($p=1$) means a single observation in space, but there can be multiple observations in time. Somehow clarify the time dimension here.

Page 8, line 2: should be “can be viewed”

Page 11, line 1: Please provide more information on the setup. What meteorological parameters are varied with time? What is meant by VOC here? All measured VOCs and their oxidation products?

Page 11 line 3: ‘VOC-limited, NOX-limited, and transition region’ . . . Indicate that these refer to ozone production. How was the placement of the vertical lines determined?

Page 11 line 15: replace “slighter” with “smaller”.

Figure 4, legends are needed.

Page 13 line 22: remove period before “either”

Page 13 line 24: what is “secondary” production?

Page 13 line 26: remove one instance of “that case”

Page 15 line 5: replace “is willing to come back to” with “returns”

Page 15 line 6: replace “as” with “a”

Figure 7, bottom panel: are the colorbars saturated more often than not? If so, adjust the colorbar scaling.

Page 15 line 17: “form” should be “from”

Page 17 line 22: Simplify sentence starting with “We recall that” . . . to read “Most state-of-the-art EnKF methods use this approximation”

Page 17 line 31: Fix “The adjoint inference do not strongly changes”

Page 17 line 33: Change the model “wants to go back to” to “returns”

Page 20 line 9: Replace “more at a loss” with “negative”.

Page 20 line 10, Simplify the sentence starting with “If we now. . .”, to read “The CR rates are significantly faster than the AR ensemble rates, and the slopes of the rates (i.e. the second derivative of the concentration evolution) also differ”.

Figure 9: These are difficult to compare with the different y axis. Consider an additional plot that contains net production and net loss for each run, and including these all on the same axis (without individual reactions).

Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2017-188>, 2017.

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