

Interactive comment on “Chemical modeling of the reactivity of short-lived greenhouse gases: a model inter-comparison prescribing a well-measured, remote troposphere” by Michael J. Prather et al.

Anonymous Referee #2

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The manuscript presents the development of a new protocol for evaluating photochemistry and reactivity of air masses comparing different models with in situ measurements of atmospheric composition. The authors use synthetic in situ measurements to demonstrate the feasibility and application of their protocol. The topic of the manuscript is very timely given the wide availability of atmospheric chemistry models and observations and the growing interest in such models and observations for air quality and climate applications. I recommend publication subject to the following comments:

General comments:

C1

The manuscript is sometimes very heavy in terms of the text and some adjustments to better illustrate the points would be beneficial. Some of the figures in the supplement may be better suited in the main manuscript, particularly in Section 2 describing the overall comparison of the models in terms of the key species and the profiles of their reactivity. I suggest moving some of these to the main manuscript.

In the summary the authors refer to the ability of 3-D models to separate the effects of photochemistry and emissions, for example, and a brief comment on models that can do this, and the advantage of their protocol over such models could be beneficial to the reader.

It is clear the use of this protocol for identifying and evaluating inter-model differences is very useful and some bullet points on the main highlights of the findings in this regard could be helpful.

Specific comments:

Page 8, line 218: 'x' should be subscript in HO_x

Page 13, lines 303-304: should "and find out" be "to find out"?

Page 13, line 309: the beginning of the sentence "For most all models" doesn't make a lot of sense, please clarify

Page 15, line 367: should "notable" be "notably"?

Page 18, line 412: it isn't clear what is meant in describing the selected day - does 8/16 refer to a generic or specific day in August 2016? This is also referred to later in the manuscript.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-470, 2018.

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