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Interactive comment on “A comparison of atmospheric composition using the Carbon Bond and Regional Atmospheric Chemistry Mechanisms” by G. Sarwar et al.

Anonymous Referee #1

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This manuscript presents a comprehensive comparison of CMAQ regional air quality model output from model simulations with two different chemical mechanisms. The more standard implementation of CMAQ is with the CB05TU mechanism, and the paper represents the first use of the RACM2 mechanism in this model. The paper demonstrates considerable change in a number of chemical species between the two model simulations. For example, the RACM2 mechanism produces more ozone than does the CB05TU mechanism. This improves the predictions relative to observations at high ozone mixing ratios. However, when the models are applied for control strategy evaluation, there is no significant difference in the result between mechanisms for

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either ozone or fine particles.

In general the manuscript is very well written. I am assuming that the figures will be sized somewhat larger when the paper is published than they are in the pdf file have reviewed. Some of them are too small and difficult to read in their current size.

Specific comments: page 6932, lines 16-25: How do you know H₂O₂ in Houston should be comparable to that in the Northeast? I don't think the paper benefits from having the Northeast data used here.

page 6933, lines 25-27: What support is there for this assumption about similar magnitude PACD over China and the US? Again, might be better to leave this out if there is no support for this.

page 6934, lines 14-23: How do you know MEPX is comparable in Houston and the Northeast? Again, I don't think the paper benefits from this type of comparison.

page 6935 – Section 3.2: Why is model and observed NO_x (from TEXAQS and SEARCH) not compared?

page 6940, lines 17-27: Can you provide a quantitative assessment of the improvement in predicting high ozone provided by RACM2?

page 6942, line 25 and following page: Are these data from all CASTNET sites in the US?

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 6923, 2013.

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