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Interactive comment on "Assessing the CAM5 physics suite in the WRF-Chem model: implementation, evaluation, and resolution sensitivity" *by* P.-L. Ma et al.

Anonymous Referee #1

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This is an excellent paper summarizing a major accomplishment, which is to port climate model physics into a mesoscale model and make this available to a broader community. The paper documents this process well and will serve as a valuable reference for those wishing to test CAM5 physics over regions and at different resolutions, especially the chemistry aspects. The paper clearly discusses the technical challenges of the work. Overall I recommend this work for publication and include some minor suggestions that may help its clarity.

Minor Points 1. p6165, line 26. Please mention whether this cloud fraction also includes components from the shallow convection and deep convection or not. The sentence implies just microphysics.

2. Figure 4. The thing that stands out most in Figure 4 is the high IWC reaching 1 g/m3 and its bias, but nothing is said of this.

3. Figure 5, p6174. For BC and OM, this seems to only reach three orders of magnitude because of occasional dips, but generally magnitudes are OK. From this figure alone, I would conclude spurious low events rather than a bias for BC and OM, at least (the bias is more obvious in Figure 6). I recommend modifying the discussion of bias for this Figure.

4. p6175, line 11. Typo "models consistently"?

5. Figure 7, p6175, line 19. The argument about source deficiencies is more supported by the fact that the peak value was about correct. If transport deficiencies dominate, the peak would also be affected, I think.

6. Figure 8. Is this the whole domain? A domain map would be useful. If this is the domain, I think Barrow may be close to the north boundary, but the location of Barrow is not given in the paper.

7. p6176, line 2. It was not quite clear, but I assume this range is for the corresponding 16x16 points in the 10 km domain. I think also of interest would be how the 160 km average of the 10 km run compares to the 160 km point value. When time series or values are shown among the different resolutions I am assuming these are all nearest point values rather than averaged to the same reference area, but this could be stated, if it hasn't been.

8. Figure 9, p 6177. I would also note about this Figure that there is always a significant jump from 20 km to 10 km as though this resolves something new.

9. Figure 10. I assume this is a domain-wide average, but that is not stated.

10. p 6178, line 18. Which land-surface model is used in these simulations?

11. Figure 14, p6180, line 21. Too "little" light precipitation? Perhaps a confusing way

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to put it. Too much precipitation where observed precipitation was light would be more precise.

12. Figures 15 and 17. I think mean profiles over the period would summarize the figures well.

13. Figure 16, p6181, line 2. The long tail at the high end stands out for CAM5 and could be mentioned. A similar thing is implied by the IWC in Figure 18. Interestingly insensitive to resolution implying a well resolved microphysics effect.

Interactive comment on Geosci. Model Dev. Discuss., 6, 6157, 2013.

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