

Interactive comment on “Development towards a global operational aerosol consensus: basic climatological characteristics of the International Cooperative for Aerosol Prediction Multi-Model Ensemble (ICAP-MME)” by W. R. Sessions et al.

Anonymous Referee #2

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This paper presents a multi-model aerosol forecasting ensemble system for global NWP models. A simple consensus ensemble was created based on model forecasts from a few institutions. The authors evaluated the performance of the consensus ensemble against AERONET data using a few quantitative metrics. Common problems and diversity among models are also identified. This study has impact on both the aerosol modeling research and the operational forecast. It also serves as an important reference of the project. The manuscript is in general well written and the results are clearly presented. I would recommend publication of this manuscript after my following

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comments are addressed.

I have two major comments: First, in my opinion, the abstract includes too many introductory sentences (P14935, L1-12) and some unnecessary details (P14935, L20-23). If removed, the reader could focus more on the new methodology and findings in this study.

Second, I would suggest the authors to move the description of input models (P14940, sect. 2.1.1-2.1.7) to appendix. The authors mentioned that they emphasize the ensemble result and the relative spread in skill, but not the specific metrics of individual models. The individual models are hardly mentioned and discussed in the "results" part. As a reader, I feel these model details are not vital for understanding the results. If the authors insist on keeping the model description part, I would recommend they summarize the model details in a table and list the important information such as host forecast model (horizontal and vertical resolutions, model time step, etc), aerosol modeling methods (bulk, modal, or other methods; provide some references), composition and size cutoff, number of tracers, treatment of aerosol emissions and chemical processes, etc. The current model descriptions for individual models are quite scattered and not balanced.

My other specific and technical comments are listed below:

P14939, L4: modal -> model

P14939, L5: would be nice to add a web link to the project website

P14940, L24: ICAP -> ICAP

P14941-14948, sections 2.1.1-2.1.7: suggest to move them to appendix

P14949, L15: How did you initialize the model at the beginning of the forecast? Do all participating models (whose results are shown in this paper) have data assimilation system for aerosol properties? How different are the AOT fields from individual models at +0h?

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P14949, L17: suggest to separate Fig.1a from the rest of panels in Fig1, since they are not related.

P14950, L9-10: what is the size cutoff for the fine and coarse modes?

P14951, L9: please define "gross fractional error".

P14952, L15-16: please check the grammar here.

P14952, paragraph 2: do you use 6h mean values or instantaneous values?

P14952, L28-30: this sentence is not clear to me.

P14956, L7-8: Where do they have lower biases?

P14956, L14: Why at some sites the model biases are even smaller as forecast day increases? Does this indicate these sites are mostly affected by local/nearby sources and less affected by meteorology and the aerosol transport from remote areas?

P14957, L3-4: why this implicates biases in the analysis? Meteorological analysis?

P14959, L12: How reliable is the AERONET dust AOT data? And which number in fig.9 is the ensemble mean?

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 14933, 2014.

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