

## ***Interactive comment on “Intercomparison of modal and sectional aerosol microphysics representations within the same 3-D global chemical transport model” by G. W. Mann et al.***

### **Anonymous Referee #2**

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This manuscript makes a detailed comparison between modal and bin-based aerosol modules in a global modeling framework. The paper is original and scientifically sound. The paper can be accepted for publication after the authors have addressed the following, mostly minor, issues.

Major issues:

My main criticism is related to the general structure of the paper. First, there are two types of comparisons in the paper: those between the two model approaches (sections 3, 5, 6 and 7) and those between simulations and observations (section 8). The authors should make a clearer distinction between the two types of comparisons (now, for ex-

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amples, biases are used to in both comparisons to indicate differences). Second, in the middle of model-model comparisons (section 4) there is a separate discussion (section) where observations are used to back up the revised model presentation. This, again, confuses the reader when reading the text for the first time. Third, there are extremely short sections (sections 5, 6 and 7.4). While understandable in case of subsections, having main sections with only 1-2 paragraphs is a bit strange and does not give a balanced impression. These structural issues do not necessary require much extra work but I would encourage the authors to rethink the overall structure of the paper.

Minor issues:

Page 627, lines 19 to the next page. For completeness, the authors could mention the moment-approach which, in addition to modal and bin approaches, is yet another way of representing the aerosol number size distribution in aerosol modules.

Page 628, lines 4-13. How extensively modal and bin approaches have been compared with each other in box or other models other than global models? Are the examples mentioned here just a fraction of the work done on this issue or do these examples represent majority of that work?

Page 631, lines 20-21. What information are the main features mentioned here based on? Are they main features found from modeling studies or observations, or from some combination of model simulations and observations?

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Interactive comment on Atmos. Chem. Phys. Discuss., 12, 623, 2012.

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