

Interactive comment on “Evaluation of spatio-temporal variability of Hamburg Aerosol Climatology against aerosol datasets from MODIS and CALIOP” by V. Pappas et al.

Anonymous Referee #2

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Review of "Evaluation of spatio-temporal variability of Hamburg Aerosol Climatology against aerosol datasets from MODIS and CALIOP" by V. Pappas et al. submitted to Atmos. Chem. Phys. Discussion (acp-2012-925).

In this study the global aerosol climatology dataset of Hamburg Aerosol Climatology (HAC) is compared with satellite retrievals of MODIS and CALIOP to verify whether it is quality-assured dataset or not. It is certainly important to check quality of the dataset. In many parts of this manuscript, however, there are only enumerations of numbers for the comparison and lacks of discussion on differences and agreements between HAC and the satellite retrievals, so that there are little information for readers of this paper

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and users of HAC. Therefore I suggest that the authors should revise the manuscript to address major and minor comments indicted below first of all.

<Major comments>

1. As a whole, there are lacks of discussions why HAC data are different from or coincident with MODIS and CALIOP from Chapters 3 to 5. In Chapter 5, for example, discuss reasons for page 5141, lines 14-15; page 5142, lines 1-6, 8-14; pages 5142-5143, lines 27-2; page 5143, lines 3-6.

2. In order to discuss quality of HAC, detailed explanation of HAC is mandatory. Indeed, we should read Kinne et al. (2008, 2013) to understand HAC. However the author should explain in Section 2.1 how to make the HAC dataset in more detail. Otherwise this paper is meaningless. For example, if the AOD spectrum is discussed in Chapter 4, the detailed explanation how the spectrum HAC AOD data were made is needed in Section 2.1.

3. In this manuscript, there are no general information on confidence level with numerical values of uncertainties for HAC. The authors write "The HAC AOD is very useful for distinguishing between natural and anthropogenic aerosols and provides high spectral resolution and vertically resolved information" in Abstract and "According to our analysis, the HAC data for aerosol optical depth (AOD) have proven to be accurate enough to be used for aerosol studies" in Conclusions, but they are too rough. On the other hand, it is meaningless to repeat trivial numbers described from Chapters 3 to 5 in Abstract and Conclusions. Readers need general information on confidence level (i.e., high, medium, and low) with numerical values of uncertainties (i.e., factor of 2, 0.1 of AOD) for regions, spectrum (UV, visible, and near-infrared), and altitude (boundary layer, middle troposphere and upper troposphere). They should be described in Abstract and Conclusions.

4. English is poor as a whole. The manuscript must be checked by native speakers.

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5. page 5127, line 11 and page 5129, line 14: Why isn't MODIS data used for recent years after February 2007?
6. page 5137, lines 3-5: This is a very important point. Explain in detail.
7. page 5137, line 19: "except for UV". Discuss why.
8. page 5138, lines 8-9: Discuss why.
9. page 5145, lines 17-18: "especially when it comes to locations, where neither ground-based or satellite data exist". The HAC data where neither ground-based (AERONET) or satellite (MODIS and CALIOP) data exist are not examined in this study. Therefore this sentence is out of this study and then should be deleted.

<Minor comments>

page 5124, line 14: Change "UV" to "ultra violet (UV)".

page 5125, line 7: "Air pollution" is not a source of aerosols but a phenomenon. It should be changed to "fossil fuel consumption" etc.

page 5125-5126, lines 26-1: Cite representative papers on aerosol products for AERONET and each satellite sensor.

page 5127, lines 1-2: Change "pre-industrial" to "natural"

page 5127, lines 7-8: This sentence is not correct. Only one year data is used for MODIS, but Kinne et al. (2006) used data from several satellite sensors with various periods.

page 5128, line 12: Change "South East Asia" to "East Asia".

page 5128, line 12: Typo. "Beijing".

page 5128, line 17: Change "North Hemisphere" to "NH".

page 5129, line 13: Add the primary references of MODIS Collection 5.

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page 5131, lines 11-13: Is this sentence correct?

page 5131, line 14: What is "airborne"? Aircraft measurements?

page 5131, line 21: Add ", Japan" after "National Institute for Environmental Studies".

page 5132, line 24: Delete "Our". MODIS data are not yours.

page 5134, line 7: Add ", and East Asia" after "United States".

page 5138, line 8: Change "Figure 8c" to "Figure 6c".

page 5140, line 7: Change "confined" to "concentrated".

page 5140, lines 7-8: "up to 3-4km". The boundary layer is not so deep.

page 5142, line 7: What is "mixed"?

page 5142, lines 20-22: Atmospheric environment in India (polluted region) is much different from that in Dalanzadgad (dust region), so this sentence is nonsense and misleading.

page 5143, line 24: Change "2008" to "2007" (according to Chapters 1 and 2).

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