

Interactive comment on “Study of successive contrasting monsoons (2001–2002) in terms of aerosol variability over a tropical station Pune, India” by R. L. Bhawar and P. C. S. Devara

Anonymous Referee #1

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Study on the aerosol impacts on cloud formation is a very important topic. The aerosol capacity to absorb more or less the sun light is a key parameter to enhance our knowledge on the climate cycle. This paper tries to bring information and interpretation on the aerosols acting as CCN to explain the difference between two monsoon periods. Unfortunately, there are many very dubious explanations and the data used to support the demonstrations are not convincing.

Abstract

The second sentence is not clear. Yes, cloud formation is depends on aerosol concentration but the activation process is thresholded.

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Introduction

The introduction is too long and lack of clarity. Many recent references are missing. P6958 lig 24 - 69559 lig 4. References are needed. P69559 lig 4. The radiative forcing of aerosols is also a function of the surface albedo. See INDOEX results for more details where anthropogenic aerosols warm the atmosphere and reduce the radiance at the surface. P6959 lig 5-13. More recent references are available, see the works performed during AMMA. P6959 lig 14-18. See INDOEX where cloud/aerosol interaction has been widely studied. P6959 lig 19. The sentence is not clear. P6959 lig. 24. AOD is not the only one important parameter for radiative forcing. P6960 lig. 1. References? P6960 lig. 15. Is it really the focus of this paper (see abstract)? What is the specificity of Pune?

Data deduction

What are the uncertainties on each instrument (with references)?

Variation in aerosol composition

In figure 1, the uncertainties are missing. The region is not indicated in the legend. Is there no declouding process in the TOMS operational algorithm (uncertainties?)? The 3 cycles described by the authors are not very significant considering the noise level and it misses information on uncertainties. P69625 lig 5-12. Are you sure that absorbing aerosols are not also very present during winter (see INDOEX)?

Variation in aerosol size distribution

The number of points on the photometer data is weak and uncertainties are missing. Of course, there are some clouds but other data are available following campaigns like INDOEX. They have to be used for comparisons. What are the uncertainties on alpha and beta? In general the black carbon is in the accumulation mode (see INDOEX measurements). From where comes the BC found in the coarse mode? One can have large aerosols in 2002 without change of the number concentration in the accumulation

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mode. The effect on the clouds by this mode between 2001 and 2002 is thus not proven. What is the difference in term of single scattering albedo between the two years? How is defined the CER and what is the uncertainty? The difference between the 2 years is not significant during the monsoon period. One can not conclude.

Variation in concurrent meteorological parameters

During 2001, we do not observe significant differences in the AOD, how to find a maximum? It is not very marked in 2002. P6965 lig 6. Are you sure? The correlation between AOD and the temperature is not significant. A scatter plot would be more appropriate. P6966 lig 2. During INDOEX few hyroscopic aerosols have been observed because organic carbon inhibited it. How to explain the conclusion at the end of the paragraph? Moreover, the liquefaction point is reached with difficulty considering such RH values. Conclusion given lig 9 is not relevant with the values given figure 6. It must be justified with an analysis of the solubility of aerosols over Pune. The wind is stronger for 2001 during the dry season. It is probable to observe aerosol uptakes, but that seems not confirm the previous conclusion on aerosol size evolution. More information is needed. Could you discuss this important point?

Conclusion

Nothing has been proved.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 6957, 2009.

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