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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Introduction: European Integrated project on Aerosol Cloud Climate and Air Quality interactions (EUCAARI) – integrating aerosol research from nano to global scales" *by* M. Kulmala et al.

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Responses to the reviewers

1) Editor

We have decided to use month 16 as the basis of the document, just before the start of the Intensive Observational Period. The reason for this is that the overall article would in that case be too concerned in the field experimental part of EUCAARI and would not properly point out the multidisiplinarity of the project. We also did not want to include partial results, as IOP data is just starting to get available and any conclusions from

the data are still unavailable.

2) Anonymous referee 3

We would like to thank the reviewer for insightful and useful comments.

We completely agree with the referee on the complexity of the aerosol-climate interactions and the needs of many differing methods, process studies and most of all international co-operations for the better understanding of these phenomena.

Since the study on atmospheric nucleation is one of the major efforts, the authors need to elaborate what8217;s the relative importance of new particles generated due to nucleation events to the total aerosol number, surface area and mass concentrations resulted from other processes. The contribution of primary gaseous and particulate pollutants emitted from the anthropogenic and natural sources, and the secondary aerosols resulted from these sources could well be far more important to the total aerosol loading in the atmosphere. Given the inadequacy of the chemical speciation of gaseous and particulate components in the emitted pollutants, the uncertainty due to the contribution of emissions to the climate is by no means small.

The relative importance of nucleation to the atmosphere is one of the main unknowns in EUCAARI (and in fact in the whole aerosol forcing caused from aerosols), and studies of the relative strength between direct emissions and nucleation is one of the main results expected from the project. We consider the possibility of nucleation high climate effect to be so large that we used it as one of the main aspects of the project. The reason of it8217;s inclusion in EUCAARI as a separate Work Package and as one of the main concerns of the EUCAARI is can be deduced from e.g. Spracklen, D. V., et al. (2008) and Laaksonen et al (2005) and many other similar studies demonstrating the relatively large effect of secondary formed aerosols into the global CDNC. It should be noted also, that EUCAARI considers the number based aerosol emission database as one of the most important aspects of the project. Even though the database will be only European scale, it forms the background on any studies to estimate the role of

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nucleation on especially indirect aerosol climate effects.

Transport of pollutants across European boundaries is of great importance. It is not clear why four particular locations in the developing countries in India, China, Brazil and South Africa, were selected. Are the data collected going to be used to calibrate the model results, or used to compute the 64258;ux across the boundaries?

The reason of the selection of those specific sites was to extend the EUCAARI measurement network somewhat outside of Europe. The countries were chosen to represent the areas with highest aerosol loads (India and China), areas of very low previous knowledge of aerosol concentrations (South Africa) and on the Amazonian rainforest, which has very differing aerosol background from many other sites (and especially Europe). We will use the data of course as direct comparison data on global scale models, but they have many other benefits to the project: (1) By training local staff and equipping the stations we have made possible to have long-time experimental data from areas where they have only been available campaign-wise before; We consider this to be of very high importance on the future improvements on knowledge of aerosol-climate links in global scale; (2) We can try to use parameterizations of aerosol and cloud processes which have been created in European conditions in widely differentiated environments, thus either giving support or disproving the usability of these parameterizations in wider scale.

Since particles in Europe alone can8217;t be responsible for the global climate change, it becomes apparent that data collected in the past should be fully analyzed and incorporated into this endeavour. Networking with prominent scientists in these major countries is necessary to avail the models developed and valuable data collected in the past several decades. It is hope that through international incorporation and data exchanges and sharing, the negative forcing on global climate change due to particles can be estimated much more accurately than the current status.

We agree with this comment completely. One can not expect that a single project with

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mainly European contributors could solve all, or even major part of, aspects on a issue as complex as aerosol-cloud-climate-AQ interactions. One of the aims of EUCAARI is to cooperate as well as possi ble with different projects and institutions outside of EUCAARI. Also, by using a relatively open data policy of experimental results and processed aerosol subroutines, we hope to benefit the field in such scale that the initial promise of 50

Corrections to individual points:

Some editorial point: 1. In the title, project should be changed to Project 2. Pages 19430, 19431: some acronyms were not explained, such as CAARI, EMEP etc. It is better to prepare a table showing all these acronyms.

- We added a table for the unclear acronyms as Appendix C

References

Spracklen, D. V., et al. (2008), Contribution of particle formation to global cloud condensation nuclei concentrations, Geophys. Res. Lett., 35, L06808, doi:10.1029/2007GL033038.

A. Laaksonen, et al. (2005), Cloud condensation nucleus production from nucleation events at a highly polluted region. Geophys. Res. Lett., 32, L06812, doi:10.1029/2004GL022092.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 19415, 2008.

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Interactive Comment