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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Single particle analysis of the accumulation mode aerosol over the northeast Amazonian tropical rain forest, Surinam, South America" *by* R. Krejci et al.

Anonymous Referee #2

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General comments

The paper presents results from the analysis of aerosol filter samples collected over the Amazonian rain forest in the free troposphere at altitudes up to 12.6 km. According to the major elements detected in the particles, they were divided into 7 categories. A further sub-division used meteorological conditions encountered during sampling and sampling altitude. The manuscript contains important information on the subject of aerosol chemical composition in a key area of the global climate system. Although the information is limited to accumulation mode particles larger than 200 nm in diameter and to chemical elements of $Z > 11$, it makes a significant contribution to this highly relevant research area.

The results are presented in a concise way and the paper deserves publication. Particularly, the Introduction and the sections on Experimental and Meteorology give a brief and clear description of the relevant facts. However, before publication, the authors have to address the two major concerns expressed in the following.

Specific comments

1/ A major drawback of the paper is the fact that due to the deployed methods of SEM filter sample analysis, only larger particles were detectable. Furthermore, particularly for samples from the upper free troposphere, more than 90% of sampled particles were not identified. Since the analytical method is not able to detect C and lighter atomic elements, the authors draw the reasonable conclusion that the particles of the NON DTERMINED (ND) category are composed of organic material. However, this is still an assumption which is not justifiable. The authors should keep this limitation in mind when interpreting their observations. To give an example from the Discussion section: more than 90% of the particles observed at altitudes between 4 and 12 km ARE ASSUMED TO BE composed of organic matter, instead of ARE COMPOSED OF!!. This holds also for the abstract. In particular the entire Discussion section is built on the assumption that the ND particles are composed of organic matter. I recommend to soften the conclusions and to focus the paper on the presentation of the important results.

2/ A further limitation of the presented results is the fact that the authors first state that for particle sampling a near-isokinteic inlet was used. Nevertheless, the authors attempt to give absolute numbers for the atmospheric concentration of different particle classes. This approach can only be applied when the authors demonstrate, that the sampling efficiency of their instrumentation including the inlet characteristics is close to 100% for the relevant size range. Otherwise, they cannot link the number of analysed particles to observed particle size distributions. A very valuable information would be the comparison of size distributions measured by the deployed optical particle counter and the respective size distributions obtained from the filter sample analysis. The re-

ACPD

4, S226–S228, 2004

quired material should be available because the authors determined the size of analysed particles and measured size distributions in situ.

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