

Interactive comment on “Spatial and temporal distribution of atmospheric aerosols in the lowermost troposphere over the Amazonian tropical rainforest” by R. Krejci et al.

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We thank referee for comments and suggestions and below present our answers. First the original comment from reviewer is presented, followed by author's comments.

1. The paper could contain a bit more discussion why, as far as I know, there are no earlier observations of biogenic formation over rainforest. Is this due to lack of proper measurements or were the conditions (atmospheric conditions, field site) in this study somehow different? The recent review paper by Kulmala et al., *J. Aerosol Sci.* 35 (2004), 143 cites more than 100 publications reporting ultrafine particle observations, but there is not a lot about Amazonian rainforest.

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Similar thoughts we had during data analysis from the LBA-CLAIRE 98 project and on our opinion there are two main reasons why there are not many papers published about biogenic aerosols compared for example to biomass burning aerosols are. a) The main focus of scientific community over last decades was on characterization of biomass burning pollution and its effects on biosphere, hydrosphere, atmosphere and functioning of tropical rain forest ecosystem. Majority of observations were located in environment perturbed by anthropogenic activities and did not allow addressing aerosol processes over pristine rain forest. b) Secondly, as far as we are aware, there are no observations available of new particle formation in boundary layer over the rain forest similar to common view of this process. Ground based observations (for example [Zhou et al., 2002]) did not show any new particle formation events similar to mid-latitude observations [Kulmala et al., 2004; Makela et al., 1997]. Only fresh Aitken mode particles were observed grown already to 0.02 - 0.03 μm in diameter. c) In addition to point 2), such comprehensive and state of the art instrumentation allowing observation of new particle formation was not deployed airborne over Amazonia before LBA-CLAIRE 98.

2. p. 3582, paragraph starting on line 11: what is the meaning of reporting CO₂ data in this context, what does it tell as regards particles and nocturnal residual layer? What is the hypothesis mentioned on line 21?

Carbon dioxide measurements were used to support hypothesis about nocturnal transport of the marine boundary layer inland over the rain forest when marine air is moving inland with trade winds above shallow continental nocturnal mixed layer. In case that air in this part of the troposphere would be previous day continental mixed layer air, it will be depleted of CO₂ due to photosynthesis, compared to the MBL air. In case that air in this part of the troposphere would be influenced by sources and sinks on the ground during nighttime, the concentration of CO₂ will be enhanced compared to MBL due to a nighttime respiration of tropical vegetation [Williams et al., 2001]. Therefore observed stable CO₂ mixing ratio 371 ppmv in a layer more than 1 km thick above nocturnal mixed layer supports the possible origin of this air to be MBL air. The measured mean

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MBL CO₂ mixing ratio in a course of the LBA - CLAIRE field campaign was 370.4 ppmv with standard deviation 0.5 ppmv.

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 3565, 2004.

ACPD

4, S3825–S3827, 2004

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