

Review of “Fine-Mode Organic Mass Concentrations and Sources in the Amazonian Wet Season (AMAZE-08)” by Chen et al. (Manuscript Number: acp-2014-352)

### **General comments**

This paper presents the results of on-line measurements of sub-micrometer organic aerosol (OA) obtained in a tropical rainforest in the Amazon during the wet season. The study examines in detail the formation pathways for OA, by mainly focusing on statistical analysis (i.e., PMF) of the HR-ToF-AMS data sets. Based on these analysis, the authors suggest the comparable importance of particle-phase and gas-phase pathways for the secondary production of OA during the study period.

The present work may provide valuable data in our understanding on formation processes of OAs particularly associated with the oxidation of biogenic VOCs. The manuscript fits with the scientific scope of ACP. In my opinion, however, new scientific finding does not seem to be emphasized in comparison with some previous works. Although a data set presented is valuable, there are some important issues that need to be worked out. I recommend its publication in ACP after some revisions raised below.

### **Specific comments**

(1) My major concern is about the discussion on Figure 8: What is the major difference between the Period 1 and Period 2 from viewpoints of meteorological conditions, photochemical field, etc.? What is the major factor controlling the fractional contributions by each factor, particularly OOA-2 and OOA-3? None of the explanation has been made in the text. The authors should discuss these points because this is one of the most important part of this paper.

(2) Figure 9 summarizes the processes for BSOA in the Amazonian wet season. However, most of the processes shown in the figure have been already reported or suggested in previous studies and seem to be somewhat “general” picture which one can find in a textbook. The authors should emphasize in the figure what the new findings are in this study with making a quantitative statement.

(3) If the OOA-2 factor represents the particle-phase reactions, then what is the time scale for this factor? The reaction is expected to be much faster than that represented by the OOA-3 factor which is associated with gas-to-particle partitioning of the BVOC oxidation products on a timescale of several hours (P. 16166, L7-9). Are these timescales supported by the time lag between OOA and BVOC? It is not clear from the

diurnal profiles in Figure 7.

(4) P.16163, L.16-18: “The OOA-1 factor... African biomass burning.” I cannot logically understand this sentence. Do the sentences below in this paragraph (P.16163, L.18-P.16164, L.9) support this sentence?

(5) P.16163, L.19: “a prolonged atmospheric residence time” What is the exact time scale for this? Please provide more quantitative statement.

(6) P.16163, L.27: Chloride is also a tracer for sea salt, and black carbon can be attributed to not only the biomass burning emissions, but also other burning sources, such as fossil fuel burning. The authors should rephrase the sentence or change the logic of it.

(7) P.16163, L.23: “Africa” should be “African”