

## ***Interactive comment on “Characterization of aerosol particle episodes in Finland caused by wildfires in Eastern Europe” by J. V. Niemi et al.***

**Anonymous Referee #1**

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### General Comments

This paper presents microphysical and chemical results of aerosol measurements in Finland. In the main focus are events dominated by long-range transport of wildfire plumes. Detailed data, including mass and number distributions and elemental mass concentrations (water-soluble part) are presented and discussed. The characteristics of the size distributions are used to identify biomass burning aerosols. The authors conclude, that wildfires from Eastern Europe and Russia affect the PM<sub>2.5</sub> mass and the air quality in Finland. Despite the general discussion of the chemical results, there is a lack of unambiguous conclusions based on these chemical data. The applied methods and data presented, are of high quality except for the presented individual

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particle analysis (IPA), which shows only poor quality (see detailed comments).

The authors present important observational data for particulate long-range transport from wildfires and/or anthropogenic sources (mainly based on the microphysical results). The manuscript is recommended for publication in ACP after considering the minor changes discussed in the following and a careful revision of the presented SEM results. The use of grammar and spelling should carefully be checked .

### Specific Comments

Title: The paper deals with a wide range of particle sizes and not only with PM2.5. This should be visible in the title.

Abstract: Line 6: change “elemental analyser to ...”... scanning electron microscopy (SEM) coupled with energy-dispersive X-ray microanalysis (not diffraction !!!!!) (EDX)

The short description of the applied IPA procedure brings up some questions and criticism:

- which substrate was used for IPA sampling (page 3)
- the method of particle transfer and analysis, described on page 4, is questionable. The “randomly” selection of particles often depends from a specific operator. It is absolutely necessary to analyze all particles in a selected field for a representative result.
- after the agglomeration of individual particles (because of a sampling method, which is obviously not suited for IPA) all conclusions about the original particles are questionable. (page 5)
- a quantitative EDX analysis of particles is very difficult, because of the irregular shape of these particles. All presented results are “semi-quantitative”. If carbon, nitrogen and oxygen are not analyzed, the presented wt% values can be used as relative values for a comparison, but never as absolute values (??8,9%?? K in S-rich particles). (page8)

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