

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

Anonymous Referee #2

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General Comments

The manuscript reports results from aerosol microphysical and chemical composition studies at several sites in Finland during long-range transport events of wildfire plumes and during clean conditions. Covered aerosol properties were total mass concentration, number concentration of Nucleation, Aitken and Accumulation mode, elemental composition and mass concentrations of water-soluble species. The authors identify the ratio of Accumulation mode number to Aitken mode number as a key microphysical indicator for biomass burning aerosols. With respect to chemical composition there is no unambiguous identifier found, although the fraction of S-rich particles and the weight-% of K was increased during the episodes. The authors conclude from their

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observations, that wildfires from Eastern Europe and Russia affects the PM_{2.5} mass and thus air quality in Finland considerably.

The authors present important observational data for the growing scientific area of long-range transport of particulate atmospheric constituents from biogenic and/or anthropogenic sources. The manuscript is recommended for publication in ACP after considering the minor changes discussed in the following. The presentation is of high quality, but the use of grammar and spelling should carefully be checked .

Specific Comments

Title:

The paper focuses on sub- μm aerosol but not exclusively on PM_{2.5} mass. An adequate change in the title of the manuscript is recommended.

Abstract:

Line 4: change to ... that emissions originated from wildfires ... Line 6: change to ... scanning electron microscopy (SEM) coupled with energy-dispersive X-ray diffraction (EDX) for elemental analysis ...

Introduction:

Very frequently the word “the” is missed, e.g. in line 3: ... in areas with local emissions, the major fraction ... Please check the entire manuscript wit respect to the proper use of “the”.

Material and Methods:

Section 2.2: Specify the sampling protocol including the distance of the sampling inlet from ground level. It would be very illustrative to show two representative particle size distributions for cases wit and without wildfire aerosols.

Section 3.2: Give a reference for the statement, that Aitken mode particles are not

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subject to long-range transport. To my opinion the current statement in Section 3.2 is debatable. Check also the consistent typing of Aitken mode.

Section 3.3: Discuss the statistical significance of the effects of LRT on the ratio of the ion sum to PM10 as displayed in Fig. 8.

Summary:

Line 4: change to ... The composition of individual ...

Figure 2 and Figure 7: change title of Y-axis to mass concentration

Figure 6b: give a title of the Y-axis

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 2469, 2005.

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