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Atmospheric Chemistry and Physics Discussions

Interactive comment on "A one-year comprehensive chemical characterisation of fine aerosol ($PM_{2.5}$) at urban, suburban and rural background sites in the region of Paris (France)" *by* M. Bressi et al.

Anonymous Referee #3

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The paper is an interesting and important contribution to the investigation of the European aerosol situation. Long term measurements at different sites in parallel can help to identify the sources and the seasonal variability. Figures and tables are well selected. The applied methods are well described or cited but in case of the dust evaluation the applied calculations are allowed for aerosol samples with sodium contents of purely marine origin. Paris and the environment are influenced by different other sources, like biomass burning, ground erosion and sometimes street deicing. Typically, the latter two factors were more important in PM10 but at the very low concentrations it

has an impact on the dust contribution. In Fig. 11 "Sea Salt", the highest concentrations were measured during fall and winter in urban and suburban samples and not in NWR. The comparison between filter and on-line determined masses (3.3, page 29403-4) has to be rewritten, partially: The TEOM-FDMS underestimates masses because the operating temperature of 30°C: ammonium nitrate and some SVOC were lost. Fig. 3 delivers lower concentration in TEOM data than in filter samples. The sentence in lines 24 to 27 at page 29403 delivers an opposite result and is wrong! An overestimation of sea salt leads to an underestimation of dust in this evaluation followed by an overestimation of OM caused by a conversion factor fOC-OM which is too high. Guinot et al. (ACP 7, 1657-1670 2007) used f=1.4 for Paris. In other European cities highest EC concentrations were reported during the winter months (e.g., H. Puxbaum et al. / Atmospheric Environment 38 (2004) 3949–3958; M. Glasius et al. /Atmospheric Environment 40 (2006) 7115-7124). Do you have an explanation why in Paris not? Biomass burning plays an increasing role for the European PM concentrations during the heating period. Putaud et al. (Atmospheric Environment 44 (2010) 1308-1320, Annex 5) described the possible errors of the applied functions for sea salt, OM and dust estimation to $\pm$25%, $\pm$35% and $\pm$150%. Unaccounted amounts of the aerosol do not exist in this study – aerosol water is low at rel. humidity of 30 % but not zero – look into the cited paper of Sciare et al.! Considering all these remarks the conversion factor fOC-OM may be lower than estimated and then in a better agreement with many earlier publications. These comments may be helpful for some minor changes in a final version of this very intensive study. At page 29410 you should add Germany into the last sentence.

Some typing corrections: page 29398, line 9: Gelman page 29401, line 12: in function 7a SIA was in cursive letters page 29402, line 22: The company name is Rupprecht and Patashnik

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 29391, 2012.