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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Elemental content of $PM_{2.5}$ aerosol particles collected in Göteborg during the Göte-2005 campaign in February 2005" *by* J. Boman et al.

Anonymous Referee #1

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General Comments: The manuscript describes the concentration of fine particulates during the winter time in Goeteborg, Sweden. The authors draw from different sets of measurements and try to identify sources. Unfortunately, the manuscript is not very coherently presented and the organization is quite poor. Many passages are repeated several times throughout the text whereas subjects relevant to the study are not sufficiently well presented. The references cited are very selective and major references in the field are missing. Some results (e.g. health related studies) are presented as new findings, despite a brief literature search provides numerous references about this subject. The authors would be well advised to consult the literature, before submitting a manuscript. Table 6 is missing and figure 1, showing wind speed and directions, should

be presented in a more clearly fashion. Lastly the manuscript in its current form does not show any new scientific achievements nor is the discussion well enough presented to warrant this. In order to be publishable the manuscript needs a more substantial and detailed discussion of the results as well as a more thorough consultation of available literature in this field.

Detailed Comments: Introduction: Air quality standards are not new inventions, but do exist since quite some time in many countries. In the same vain, studies relating health and particulate pollution are not new, but have been carried out on a systematic basis at least since the 1990’s . See for example Dockery et al. 1993 and Schwartz et al. 1992. Therefore the statement that this is new or recent is not correct. A detailed description of the PM2.5 standard is not necessary. Readers of AC&P are aware that PM2.5 standards are important for human health. It is, however, necessary that the authors explain more in depth the relationship between PM2.5 and wind profiles and how these aid in source apportionment. The studies selected regarding measurement of particulate constituents are very selective. Research in this direction has been carried out for quite some time and should be reflected in the references.

Methods: EDXRF is a well established method for analysis of airborne particulate filter samples and this should be also mentioned in the text as well as supported with references. The authors should explain what a “certified uncertainty of 5%” is. How many times was the filter analysis repeated to determine the 5% uncertainty? This is important to know as the credibility of the results shown depends on statistical evidence.

Results and Discussion: It needs to be clarified to what the PM2.5 values shown in the tables refer. Table 2 and table 3 are very busy and contain too much unnecessary information. They should be combined into one table showing only the days relevant to the discussion. A discussion of major air mass patterns at the time of collection should be presented to inform the reader about inconsistencies and general trends observed and expected. Many studies found that sulfur and lead are predominantly

ACPD

8, S3198–S3200, 2008

present in the fine particulate fraction. The authors should take this into account and add references to this section. When presenting the sulfur concentrations found in the sample a more thorough discussion about its sources is required. It is not sufficient to attribute the sulfur found solely to ship emissions. The contribution of sea salt sulfate should also be carefully evaluated. The authors should be careful in generalizing their comments about elemental concentrations found at the two city sites and the elevated site. The concentration of a few elements did roughly double, but this is not the case for all elements. A more in depth discussion is needed here. The statement that on windy days more coarse particulates are present, which then join the PM2.5 fraction is not quite valid. Most of the coarse particulates are far too short lived in the atmosphere and settle quickly close to the source to be detected further away. A significant fraction of the coarse particulates is also found in the PM10 fraction. Data obtained from ion chromatography analysis are missing and should be presented. A table presenting inversion situations during the campaign should be presented, as a large part of discussion hinges on this argument.

Considering all the comments from above, the manuscript in its current stage is not ready for publication and should be thoroughly re-evaluated by the authors.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 7703, 2008.

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8, S3198–S3200, 2008

Interactive Comment