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Atmospheric Chemistry and Physics Discussions

# *Interactive comment on* "One decade of parallel $PM_{10}$ and $PM_{2.5}$ measurements in Europe: trends and variability" *by* I. Barmpadimos et al.

**Anonymous Referee #1**

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General Comments: This paper summarizes the analysis of the trends and variability of PM10, PM2.5 and PMcoarse particle concentrations at selected sites in Europe, which is an interesting research area with implications for air quality, climate, and human health assessments. The results are valuable especially for coarse PM particles since the research on the characteristics of coarse PM has been much less extensive compared PM2.5 particles. The paper is scientifically sound and well written. It merits publication in ACP after the consideration of the following remarks:

Specific Comments: The convergence observed during the recent years between urban and rural concentrations in the two European regions examined (in the UK and in Switzerland) leads to the conclusion that in fact the regional background particle concentrations are a very important factor in determining the particle concentrations even



within urban areas in Northern and Central Europe. It should be added that this characteristic has been observed in the Eastern Mediterranean since the beginning of the atmospheric particle measurements there (e.g. Gerasopoulos et al., Atmos. Environ., 2006, Kalabokas et al, Gl. NEST J., 2010). Therefore, the air pollution from particles in urban areas in Europe is to a large extent a regional scale phenomenon and the pollution abatement strategies applied in the European continent should take this into serious consideration. I think that the above aspect has to be more emphasized in the text.

I would suggest that the link between prevailing wind direction and particle concentration has to be more closely associated with the corresponding weather patters. Concerning the weather patterns (GWL) leading to high PM concentrations, I think that it would be more helpful if the selected GWLs are separated into more homogenous subgroups. For example, as observed in the mentioned reference (Gerstengarbe et al., 1999) the high-PM GWL could be separated into three subgroups with short names A, T and Z (p.22, Tab.4). These subgroups correspond to atmospheric synoptic circulation types with different influence mechanisms on air pollution (cyclonic or anticyclonic synoptic atmospheric conditions). It would be more useful to make the corresponding statistics for each GWL-subgroup (as in Fig. 7) and then examine the influence of the prevailing wind direction on the observed atmospheric particle concentrations (as in Fig. 4). Alternatively, the frequency of occurrence of each GWL subgroup should be reported for every year of measurements and include this information in the trend analysis of PM (Fig. 6) as well as in the examination of the wind direction influence on atmospheric particle concentrations (Fig. 4).

Technical corrections: Figures 6 and 8 should be better plotted in the same scale.

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