We thank Rong Li, Christine Wiedinmyer and Michael P. Hannigan for their useful comments. Point-by-point responses are given below in italics:

1. Is there any reason to choose only seven sites across Europe? Is it possible to have more sites that may provide a better representation of Europe? In any case, a justification for selecting the sites may help improve the manuscript.

One of the requirements for the datasets to be used in this study was that they cover approximately one decade of measurements or more. Most regular daily gravimetric measurements of $PM_{2.5}$ in Europe started in 2005 or 2006 and therefore it was difficult to find stations providing decade-long parallel time-series of PM_{10} and $PM_{2.5}$. This and additional criteria concerning data quality, time resolution and spatial coverage limited the number of suitable stations to 7.

2. The sites chosen for analysis have very low coarse PM concentrations, i.e. 3-7 µg/m3 at six of the seven sites (the seventh, Bloomsbury in UK, has an annual mean of 14 µg/m3). The concentrations between 3-7 µg/m3 may be close to the background, and thus the trends as well as relationships between the low coarse PM concentrations and local meteorological conditions may not be robust. The authors may want to address this in the manuscript, and even consider keeping only the calculated relationships between fine PM and meteorological variables.

This study focuses on background sites that reflect regional rather than local air quality conditions. PM levels at most of the sites reflect background values, which are relatively low. This is the case for PM_{10}, $PM_{2.5}$ as well as for PM_{coarse} data, which derive from PM_{10} and $PM_{2.5}$.

Considering the trends of the PM data, a low mean value does not necessarily pose a problem in terms of identifying a trend. As a matter of fact, data from background stations tend to be more suitable for trend identification because their data have a typically low short-term variability. This in turn allows deriving trends with greater statistical confidence.

The method that was used for trend identification was ordinary least squares (OLS) regression, which is indeed a non-robust method. Having this in mind, the Mann-Kendall trend test was applied to all PM time series as an independent method to confirm the trends found by OLS. The Mann-Kendall trend test was used to test if the slopes shown in Fig. 5 are significantly different from zero at the 95 % level of confidence. The test was applied on the data after "deseasonalizing". A problem that had to be addressed in this process was that the significance of the Mann-Kendall test is artificially large for autocorrelated time series. PM time-series, including the data used in this study are indeed highly autocorrelated. A bootstrap resampling technique was employed in order to account for this effect and obtain realistic levels of confidence. The results of the trend test coincide with the results shown in Fig. 5 in the sense that a significant trend is detected using the Mann-Kendall test for stations whose confidence intervals in Fig. 5 do not overlap with zero. This discussion was originally deemed redundant and therefore not included in the paper. However, it will now be added in order to address concerns regarding the robustness of the diagnosed trends.

The relationships between PM and meteorological variables are the result of a non-linear, non-parametric fit (penalised regression splines). A cross-validation method (generalised cross validation) as described in Wood (2003) is used in order to penalise over-fitting. Thus, the smoothness of the fitted functions is selected in such a way that they are not overly affected by outliers. In this sense, *care has been taken that the presented relationships are robust. As an example, we show in Fig. 1 a plot of the logarithm of PM_{coarse} vs. temperature for a station with low PM_{coarse} concentrations (Langenbruegge) and a station with high PM_{coarse} concentrations (Bloomsbury). A curve is fitted to the data using the same method as in generalised additive models. As seen on the plots, the fitted curves are not much affected by outliers and represent well the location of the data throughout the temperature range. This is the case for low and high PM_{coarse} concentrations. Probably a more important issue is the scatter of the data around the fitted curves. This is attributed partly to random error and partly to PM_{coarse} variability due to factors not included in the model. This 'unexplained variability' is estimated using the deviance explained statistic, which is discussed as a measure of model performance in Chapter 4.2 and mentioned again in the conclusions of the paper.*

Based on the above considerations, we believe that the presented PM_{coarse} trends and relationships between PM_{coarse} and meteorological variables are robust and should be retained in the paper.

3. Near line 11 on page 11: The authors mentioned that primary biological coarse PM emissions of pollen are likely enhanced at higher temperatures. Could a reference be added for this statement?

Here are some references which support the statement that primary biological PM_{coarse} emissions of pollen are likely enhanced at higher temperatures:

Clot, B.: Airborne birch pollen in Neuchâtel (Switzerland): onset, peak and daily patterns, Aerobiologia, 17, 25-29, 10.1023/a:1007652220568, 2001.

Nieddu, G., Chessa, I., Canu, A., Pellizzaro, G., Sirca, C., and Vargiu, G.: Pollen emission from olive trees and concentrations of airborne pollen in an urban area of North Sardinia, Aerobiologia, 13, 235-242, 10.1007/bf02694491, 1997.

Stach, A., Emberlin, J., Smith, M., Adams-Groom, B., and Myszkowska, D.: Factors that determine the severity of Betula spp. pollen seasons in Poland (Poznań and Krakow) and the United Kingdom (Worcester and London), International Journal of Biometeorology, 52, 311-321, 10.1007/s00484-007-0127-2, 2008.

We would also like to extend the sentence by including other primary biological particles: Yttri et al. (2011) found that plant debris and fungal spores were mostly found in the PM_{10}-PM_1 range and that the concentrations were significantly higher in summer than in winter, especially the fungal spores. They estimated at total of 40-60% of the coarse organic matter originating from these primary biological particles in Summer. Tong and Lighthart (2000) found Bacteria to be more abundant in summer and correlating with temperature and solar radiation in Oregon, USA.

4. If the authors want to keep the analysis of coarse PM, in addition to PM2.5 and PM10, we recommend that it is included in the title of the manuscript, or at least in the list of keywords.

We will change the title to: "One decade of parallel fine ($PM_{2.5}$) and coarse (PM_{10} – $PM_{2.5}$) particulate matter measurements in Europe: trends and variability".

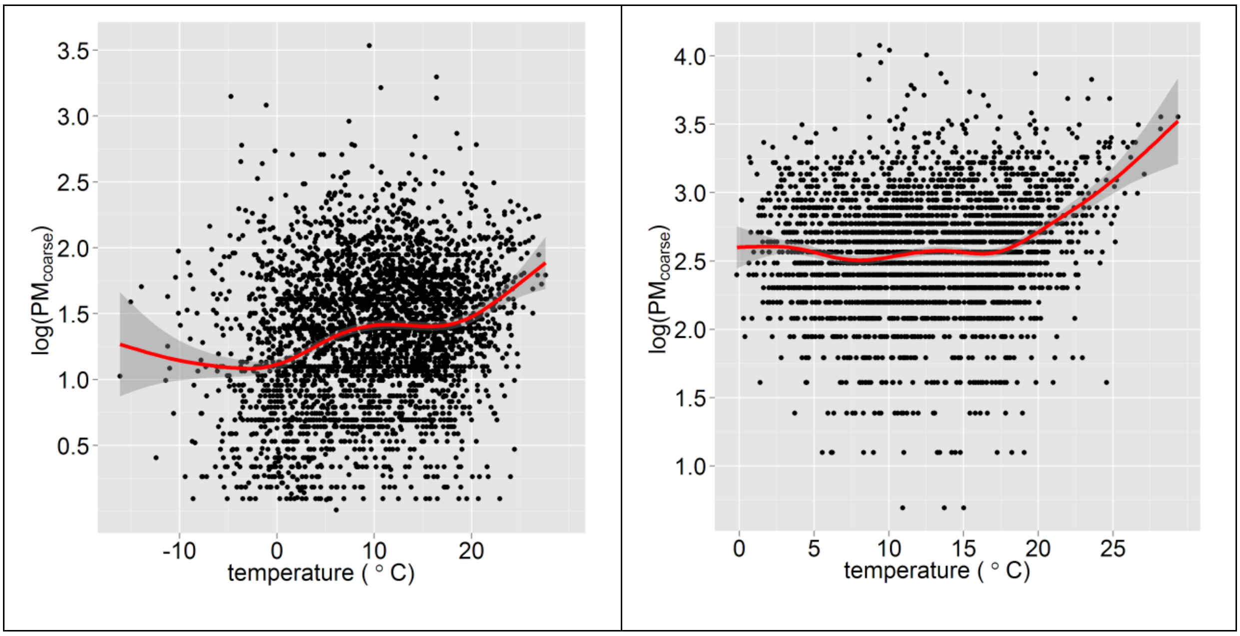

Figure 1. Plots of the logarithm of PM_{coarse} vs. temperature for Langenbruegge (left) and Bloomsbury (right). The red curve has been fitted using the same method as in generalised additive models. The grey area around the curve represents one standard deviation.