**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "Size and time-resolved roadside enrichment of atmospheric particulate pollutants" *by* F. Amato et al.

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The authors use a multi-site approach to quantify those trace elements for which road traffic is a significant source. This is a comprehensive and valuable study which provides useful insights into the sources of trace metals in the urban atmosphere. There are a few minor comments and some suggestions as to how the data analysis might be extended.

One useful outcome of the work might be to use the difference between the high traffic location and the urban background to calculate a road traffic trace element "signature". This could be useful if quantifying road traffic contributions to airborne particulate matter in other locations. Of particular interest would be the OC/EC ratio in the high traffic site increment above the urban background. This ratio corresponding to the OC/EC

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ratio in vehicle emissions is rarely measured and there are only a few sources of the data (e.g. our own work reported in Harrison and Yin: Sources and processes affecting carbonaceous aerosol in central England, R.M. Harrison and J. Yin, Atmos. Environ., 42, 1413-1423, 2008) derived from field measurements. Trace metal profiles would also be of interest.

The second issue is whether the data were in any way affected by street canyon circulations. If this is the case, then the orientation of the roads relative to the prevailing wind is important and the extent to which the influence of traffic exceeds the urban background may vary substantially from day-to-day depending on the wind direction. This is not taken account of in the plotting of vehicle traffic/wind in Figure 4 and 5. The graphs shown in Figure 2 all appear to have been forced through the origin. Some of them would appear to be best fitted by a line with an intercept but this is prevented by forcing the line through the origin. It is also not clear what method was used to derive the regression equation. Since the uncertainty in both the x and y variables is comparable, the regressions should be determined by a method other than least squares and both reduced major axis and orthogonal regression methods are commonly used for this purpose. In earlier work in which we have compared simultaneously measured roadside and urban background concentrations in a similar way to Figure 2, we found two markedly different kinds of behaviour. In one kind there was no significant intercept and the gradient of the best fit line exceeded 1. In the other scenario, the gradient of the best fit line was close to 1 but the roadside concentration showed an increment as an intercept in the plot versus the background concentration. There were also notable wind directional effects (Field Study of the influence of meteorological factors and traffic volumes upon suspended particle mass at urban roadside sites of differing geometries, R.M. Harrison, A.M. Jones and R. Barrowcliffe, Atmos. Environ., 38, 6361-6369, 2004). It would be interesting to see whether any such effects appear in the Barcelona data when plotted as suggested.