Atmos. Chem. Phys. Discuss., 12, C5134–C5136, 2012
www.atmos-chem-phys-discuss.net/12/C5134/2012/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Trends of particulate matter ($PM_{2.5}$) and chemical composition at a regional background site in the Western Mediterranean over the last nine years (2002–2010)" *by* M. Cusack et al.

Anonymous Referee #3

Received and published: 31 July 2012

The work by Cusack et al. presents PM2.5 trends, during the last decade, in a Spanish RB station (MSY) compared to other Spanish and European stations in an attempt to highlight their common features. Complete chemical analysis at MSY is then used to identify the possible reasons for the observed trends. It is an interesting work that merits its publication after some minor improvements. One of the main concerns is that it has not been possible to identify and quantify the extent to which each of the three suggested reasons (abatement measures, economic recession, NAO-meteorology) contributes to the observed trends. Any further attempt to discriminate the above contri-

butions would certainly be an "add on". Please find below some specific comments and suggestions for improvement: 1. In many parts of the manuscript the language could be significantly improved. A language review by an English native speaker would certainly help in this direction. 2. The abstract has elements that would most preferably fit to the introduction. Please retain only those parts that refer to results of this work or rephrase accordingly. 3. Pg 10997, LN 12-17: "Even though these ... in this paper". Please simplify. 4. In section 3.2, the discussion about trends at various sites should also be seen under the prism of absolute values of PM2.5. For example, one cannot directly say that the countries not affected by economic recession showed no pronounced reduction due to this reason, when they have very low levels of PM at first place. 5. In Figs 1 and 2, the year 2008 has been marked as the year of most significant decrease. How is this conclusion drawn? It doesn't seem to be consistent in all stations where the grey area has been drawn. I would suggest remove it and rearrange the relevant discussion accordingly. 6. In section 3.4.1 it is assumed that the consistent winter reduction is due to a combination of abatement strategies and the economic crisis but also to meteorology as expressed via the effects of NAO on precipitation and dust outbreaks, especially during 2009-2010. Please investigate whether the trends would still be significant if the last two years with meteorological influence were not to be taken into account. The best way would be to exclude dust days from the analysis so that the trends are mainly due to anthropogenic factors (you have the absolute advantage of chemical analyses to do so). Fig. 4 might be enriched with trends per season too, whereas I do not see any immediate add on from the use of the residuals on the plots. 7. Pg. 11009, ln 10-12: it is stated that the decreasing trend in OC is seasonally dependent. This is in contradiction with the finding that in all seasons there is a strong trend (such a statement cannot be supported by the different level of significance). 8. Pg. 11009, ln 23-25: Why don't authors use K+ as a tracer for biomass burning as they suggest, to clarify part of the OC trend? 9. Pg 11011, ln 12: Did you mean "unreasonably" instead of "unseasonably"? 10. Pg. 11012, ln 23: "As mentioned previously." This sentence should probably be linked to the one following.

11. Section 3.4.5: As in other parts of this work (see statement in 11002, ln 12-14), the discussion on trends and their significance is based on the alpha value from the Mann-Kendall test. Whereas the significance of a trend is well retrieved from the alpha value, the discussion of the trends should not, to my opinion, be based on a categorization by “alpha”, but on the absolute percentage of observed reduction, choosing a threshold significance level. For instance, if we choose a=0.05 as the threshold above which a trend analysis and result is trusted, then a reduction of 70% (a=0.05) should be more “weighted” than a reduction of 30% with a=0.01. Please, rearrange discussion accordingly.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 10995, 2012.