

Open Discussion of manuscript:: ACPD, No. acp-2012-1044

Title: Changes in Particulate Matter Physical Properties during Saharan Advections over Rome (Italy): A Four-Year Study, 2001-2004; Author(s): G. P. Gobbi et al.

Authors Reply to Reviewer #3 Comments

We thank the Reviewer for taking the time to revise our work. Our detailed replies to the referee's comments (in black italics) follow (in blue).

Reviewer General Comment

In this paper, "Changes in Particulate Matter Physical Properties during Saharan Advections over Rome (Italy): A Four-Year Study, 2001-2004", the authors use surface observations, Lidar and a dust model to infer the frequency and magnitude of dust events occurring at Rome. They use a new metric to determine the background PM10 concentrations and find that a significant fraction of PM10 air quality exceedance are related to Saharan dust events, although dust alone is not sufficient to explain the exceedance of annual PM10 thresholds. The methodology and results are clearly presented and the paper is generally clear aside from some grammar issues in places (see minor comments). The paper is recommended for publication after addressing the minor comments below.

Main Comments

It may be informative to include the fraction of days in which dust causes exceedance of air quality standards in the abstract.

Answer: Done

It may be worth clarifying in the text that line 8 of table 3 indicates that in the absence of dust no exceedance would have occurred for this percentage of days (assuming this is the correct interpretation).

Answer: In fact, line 8 of Table 3 reports the average (over 4 years) number of exceedances caused by dust events. The relevant percentages given in line 9). A clearer definition of the variables has been reported at both lines 7, 8 and 9 of table 3.

An interesting conclusion is that the background definition provided by the EU guidelines may not be optimum. If possible, it would be useful to see a comparison of the results between the two assumptions of background PM10 (e.g. numbers in brackets on Table 3 when using EU guidelines).

Answer: This is a useful suggestion. Results obtained by applying the EC guidelines have now been added in parenthesis to Table 3, line 8. Discussion of such results has been included in Section 3.2 (4th paragraph).

pg4976 In 14 - is the 60-75% estimate based on extrapolation from figure 3 of Ozer et al. (2006)? If so, can you comment on whether you think there will be any difference between the TSP and PM10 relationship at the African site in that study and at the sites in Rome?

Answer: Yes, that paper was the source of our extrapolation guess. In fact, there is a lack of information of this kind for Rome. However, this comment stimulated us to find a more appropriate reference, as the Querol et al., 2001 we now use to replace Ozer et al. 2006. Querol et al. (2001), address the PM10/TSP ratio issue for the urban conditions of Barcelona (Spain), a much more

appropriate reference for Rome. We changed accordingly the relevant discussion in Section 3.2, (2nd paragraph).

Minor revisions

Figures and Tables

Table 1 - requires units

Answer: Done

Figure 2 - it may be beneficial to use the same y-axis scale for DREAM and VELIS to highlight the differences between the two

Answer: Done

Figure 3 - the title is a little cryptic, either expand or explain in the caption

Answer: Done

Pg 4964 In6 - "such as"

Answer: Done

In13 - of (rather than from)

Answer: Done

In18 - over (rather than along)

Answer: Done

pg 4969 In2 – weighting

Answer: Done