Atmospheric
Chemistry
and Physics
Discussions

Open Access

Interactive comment on "**AIRUSE-LIFE +: Estimation of natural source contributions to urban ambient air PM$_{10}$ and PM$_{2.5}$ concentrations in Southern Europe. Implications to compliance with limit values**" *by* **Evangelia Diapouli et al.**

Anonymous Referee #1

Received and published: 18 October 2016

The paper addresses the question of the natural contributions to PM levels which – although not dealing with novel concepts – has important implications for policy abatement strategies and measures. The paper novelty stands in the attempt of evidencing differences when comparing different approaches and assessing major causes of uncertainties. The paper is clear and well written. The datasets presented are suitable for such kind of analysis. As for the methods used, they are generally scientifically sound although a major concern is related to the algorithm reported for the stoichiometrically derived mineral dust which is not compliant to the mentioned reference and – in general – does not consider Ca, Fe, and K contributions. Maybe that it is simply a typo

error but – if it is not the case – a large part of data analysis should be done again and the text modified accordingly. Another issue concerns the linear regression analyses which should be represented in more suitable way and the equations must be reported with all relevant parameters (e.g. with intercepts, uncertainties and confidence levels).

The referee suggests to accept the paper with major revisions, which should take carefully into consideration the specific comments reported below.

Specific comments: - Please correct the misuse of the possessive case throughout the text (e.g. line 17 page 1 "sources' contribution", line 13 page 3 "pollutants' removal", etc.). - Lines 16-17: Please specify if referring to aerodynamic diameter or other equivalent diameters. - It would be useful for the reader to add references for BSC-DREAM8b and FLEXTRA model. - Page 5 line 13: The algorithm reported in Marcazzan et al. (2001) is not the one written here. Please check it carefully in the original paper by Marcazzan et al. (2001) and change the data/comments accordingly if obtained with the wrong formula. - Line 18 page 5: Here mean contributions for African dust stands for the average obtained considering all the approaches reported in par. 2.2? Please specify. - Line 2 page 6: Please give an explanation for the African dust events during winter in Porto while in Barcelona they were recorded mostly during summer and at the other two cities in springtime. - Figure 4: are you sure that the suburban character of the monitoring site in Athens does not affect the results? The large difference in the proportion between anthropogenic and natural sources is suspicious. - Fig. (not Fog.) 6-9: it is not clear to the referee why the authors represented all these regression lines in a log-log scale. Moreover, 1) the regression lines often show a clear intercept which has not been reported in the regression equation; 2) the values reported for squared-R seem not to correctly represent real data dispersion. How large is the associated uncertainty? How much is this linear regression compatible with a true-linear model? The referee suggests to represent the data in a linear scale, possibly making an orthogonal/Deming regression in order to take into account uncertainties in both x- and y-data as well as the compatibility with a linear model within a given con-

fidence level. Last but not least, check if the MIN-STOICH data reported here have been calculated with the formula reported in the text or using the original Marcazzan et al. algorithm. - Line 28 page 8: also this "dirty" profile for African dust in Athens suggests that the suburban character of the monitoring site may affect the results. Please add a comment in the text. - Table 4: is there any explanation for the relatively higher intercept and slope given by BSC_DREAM model at surface level when compared to SKIRON model? - Figure 12: same comment reported above for Figs. 6-9

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-781, 2016.