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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "PM_1 geochemical and mineralogical characterization using SEM-EDX to identify particle origin – Agri Valley pilot area (Basilicata, Southern Italy)" *by* S. Margiotta et al.

S. Margiotta et al.

salvatore.margiotta@imaa.cnr.it

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Dear Editor,

On the behalf of my co-authors, I would like to thank you and the Referee for the suggestions aimed at improving the proposed study. Following the suggestions, we have revised the manuscript. We hope that the manuscript in its revised version will meet your approval and that it will be accepted for publication in the Natural Hazards and Earth System Sciences journal. Thank you in advance for your attention.

Kind regards

NATURAL HAZARDS AND EARTH SYSTEM SCIENCES - MANUSCRIPT NHESS-2014-140

PM1 GEOCHEMICAL AND MINERALOGICAL CHARACTERIZATION USING SEM-EDX TO IDENTIFY PARTICLE ORIGIN – AGRI VALLEY PILOT AREA (BASILICATA – SOUTHERN ITALY)

Authors' Response To Editor's and Reviewer's Comments

- The authors pay great attention to discriminate anthropogenic from natural pollutants and they well identify the contribute of Saharan dust events. I suggest to the authors to pay more attention to analyse the possible contribute of local emission sources (agriculture activities, industrial activities, road networks etc..).

Reply: As suggested by the Referee, we have added a sentence about the possibility of local emissions contributing to the atmospheric dust.

Changes to be made to the manuscript:

Page 300 line 22

To be added: "Furthermore, particles potentially associated with local mechanical abrasion processes, such as road dust resuspension and fugitive dust due to agricultural operationsin rural environmentsare generally characterized by coarse fraction mode (i.e. particles with an aerodynamic diameter between 2.5-10 ïĄ■m), as indicated by Watson et al. 2000, Thorpe and Harrison 2008, Colbeck et al. 2011. Thus, the contribution of these emission sources to PM1 can be considered limited."

References

To be added:

Colbeck, I., Nasir, Z.A., Ahmad, S., and Ali, Z.: Exposure to PM10, PM2.5, PM1 and carbon monoxide on roads in Lahore, Pakistan, Aerosol Air. Qual. Res., 11, 689-695, 2011.

Thorpe, A. and Harrison, R. M.: Sources and properties of non-exhaust particulate matter from road traffic: a review, Sci Total Environ. , 400 (1), 270-282, 2008.

Watson, J. G., Chow, J. C., and Pace, T. G.: Fugitive dust emissions, Crops 3, 14796, 2000.

- I suggest to better emphasize the degree of novelty and originality of the results, in particular I recommend to compare the ïňĄndings of this work with other analogue environmental monitoring activities.

Reply: In our work we identify the OSP (only-S particles) as possible markers of increased sulfur in the atmosphere. This has not been discussed in previous studies. Furthermore, we found that at the same time the Saharan episode seems to have a negative influence on air quality, in relation to the contribution of allochthonous contaminants (primarily soot), and a positive scavenging effect in removing gaseous contaminants (primarily sulfur), as a result of its deposition or nucleation on the geogenic particles that serve as substrate. Both aspects, already highlighted by authors in previous studies, have also been observed in the Agri Valley, where the Saharan episode occurring in the period studied favoured the formation of mixed particles and hid the possible effects of a flaring event on the soot amounts. As suggested by the Referee, we added further references to those already indicated, and we inserted in the "Conclusions" a further sentence emphasizing the originality of these results.

Changes to be made to the manuscript:

Page 300 Line 26

To be added "according to previous studies (Alastuey et al., 2005; Kallos et al., 2007; Formenti et al., 2011; Rodriguez et al., 2011)" after "transport".

Page 300 Line 26

To be replaced "although we cannot exclude a soot contribution from ïňĆaring." with "However, we cannot exclude a soot contribution from flaring".

Page 302 Line 20

To be removed "for the supermicrometer fractions"

Page 302 Line 21

To be added the reference "Kandler et al., 2011".

Page 302 Line 22

To be removed: "and in agreement with Alastuey et al. (2005)"

Page 302 Line 26

To be added: "In the pilot site, the Saharan episode seems to have, concurrently, a negative influence on air quality, in relation to the contribution of allochthonous contaminants (primarily soot), and a positive scavenging effect in removing gaseous contaminants (primarily sulfur), as a result of its deposition or nucleation on the geogenic particles that serve as substrate."

References

To be added:

Kallos, G., Astitha, M., Katsafados, P., and Spyrou C.: Long-Range Transport of Anthropogenically and Naturally Produced Particulate Matter in the Mediterranean and North Atlantic: Current State of Knowledge, J. Appl. Meteorol. Clim., 46(8), 1230-1251, 2007.

Kandler, K., Lieke, K., Benker, N., Emmel, C., Kupper, M., Müller-Ebert, D., Ebert, M., Scheuvens, D., Schladitz, A., Schutz, L., and Weinbruch, S., Electron microscopy of particles collected at Praia, Cape Verde, during the Saharan Mineral Dust Experiment: particle chemistry, shape, mixing state and complex refractive index, Tellus B, 63(4), 475-496, 2011.

- No comments and analyses on the possible implications of this work with future en-

vironmental monitoring activities in the pilot area are presented and discussed. This part is extremely relevant for improving the environmental monitoring strategy.

Reply: In agreement with the Referee's suggestion, weinserted in the "Conclusions" a further sentence about the importance of integrating the monitoring activities taking place in the areas affected by mining activities and oil pre-treatment processes with characterization studies of atmospheric particulateusing Scanning Electron Microscopy.

Changes to be made to the manuscript:

Page 303 Line 6

To be added: "Therefore, monitoring activities providing geochemical and mineralogical characterization of the atmospheric particulate through continuous and systematic observations using Scanning Electron Microscopy and Energy Dispersive X-ray Spectrometer measurements could be useful to identify chemical, geochemical and mineralogical anomalies of the PM composition potentially linked to flaring events and oil pre-treatment processes ongoing in the area studied."

- The quality of reference captions could be improved. The captions must be more informative and to include short comments, in the present form they only identify the data displayed in the graphs.

Reply: As suggested by the Referee, we have added short comments to some captions, in order to make them more informative.

Changes to be made to the manuscript:

Caption of the figure 5

To be added: "Silica particles and aluminosilicates are the most part of the geogenic particulate observed".

Caption of the figure 6

To be added: "Aluminosilicates consisted primarily of clay minerals, with smectite»kaolinite >illite/mica".

Caption of the figure 7

To be added: "This particulate consists mainly of mixed particles with a composed origin and, subordinately, of gypsum."

Caption of the figure 8

To be added (after the further modification indicated in reply to the anonymous referee #2): "The largest amounts of particles were observed on 28 September 2012, due to increased geogenic particle quantities. The highest soot surface densities on the ïňĄlters were identiïňĄed on the day after the ïňĆare at C.O.V.A., but soot amounts had been signiïňĄcantly increasing since 25 September, long before the event".

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 291, 2015.