

Interactive comment on “Aerosols over Continental Portugal (1978–1993): their sources and an impact on the regional climate” by A. L. Morozova and I. A. Mironova

Anonymous Referee #2

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The study investigates the variability of aerosol content over Portugal based on the major aerosol sources. They make use of the aerosol index (AI) data provided by the TOMS instrument together with two ground-based measurement sites that are characterized as urban and background, respectively. The authors develop a regression model to explain the variations in the aerosol content based on major aerosol sources of dust, forest fire, volcanic and anthropogenic origin. They also investigate the impact of these aerosols over the variability in regional climate (temperature, precipitation and sunshine duration).

The manuscript is easy to follow but requires some minor editing in terms of organiza-

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tion, particularly in the supplement that has to be shortened. There are also a number of issues I raised below that I think are important to be answered before publication.

General Comments

- 1) I recommend the authors to use “urban/regional” or the names of the stations rather than the codes since it is difficult to remember which code denotes which station.
- 2) Why are only these two stations used? More stations would represent a better source characterization. If it is a matter of data availability, this should be clearly mentioned in the text.
- 3) Is there an agreement between the source contributions estimated from this study with earlier studies (modeling, source apportionment)?
- 4) Supplementary material is very long and has to be shortened. Some figures (e.g. S1.1, S1.5, S1.7) and explanations and references can be moved to the main text. There are also overlapping text that should be removed from the supplement. Part 1.3.3 of the supplement can also be moved to the main text or at least should be summarized as dust is an important source in the area and therefore the detection of the dust event is important.

Specific Comments

Page 10, line 21: Please provide the range of % variation explained by the model rather than the minimum.

Page 10, line 21: Please provide in parenthesis the % contributions of each source discussed.

Page 10, line 25: Please provide the range of % variation explained by the model

Page 10, lines 29-32: For a typical urban site, traffic can be a very dominant emission source and can be characterized by NO_x rather than SO₂. Is there any reference for the case in Lisbon (emission studies, modeling etc.)? Can NO_x be used as a proxy

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also and explain the remaining variability that is not explained by the model?

Page 11, line 9: It would be valuable to briefly mention these climatic differences in the two sites.

Technical Corrections

Page 2, line 12: Replace "which" with "that"

Page 2, line 10: Replace "outcomes*" with "impacts"

Page 3, line 6: "... local aerosol content effecting the variations. ..."

Page 3, lines 7,8: Move the sentence "This approach. ..." to before the sentence "This information about. ..." in line 12.

Page 6, line 8: Please clarify what FFT refers to.

Page 7, line 22: "...we applied linear interpolation to estimate the missing data and calculated a single mean series"

Page 11, line 30: "... sign and are statistically ..."

Page 13, line 14: "... as for the other location."

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 31009, 2014.