**Atmospheric
Measurement
Techniques**
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Discussions

Interactive comment on "Relationships between columnar aerosol optical properties and surface particulate matter observations in north-central Spain from long-term records (2003–2011)" *by* Y. S. Bennouna et al.

Anonymous Referee #3

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General comments: The presents interesting work done to investigate connections between mass concentrations of particulate matter and aerosol optical thickness using a large data set from Spain. The topic is within the scope of AMT. The authors mention, that changes in desert dust intrusions are a notable contributor to decreased PMx trends and that the presented bimodal PM variability is dominated by dust, which are interesting conclusions.

However, I share the concern with previous referees #1 and #2 on how convincing

the presented evidence is. Importantly, the lack of bimodality in the presented AOD variability may be due to different sampling, as the authors suggest, but also likely due to changing aerosol vertical profile and changing aerosol optical properties. Also, the method of dust event detection (citation to Cachorro, 2013) needs to be clarified more as it provides the importart background to conclusions made of the importance of desert dust on the PM and AOD trends. The authors kindly provided the publication as supplement material, but for this purpose the information needs to be in English.

Specific comments: The main points of my specific comments already came up in earlier referee comments, but I raise a few technical notes to complement the discussion.

Figures are generally of good quality, but I suggest minor improvements in certain places:

Fig. 4 Legends would be easier to read if the font size was greater. Fig. 8 a and c should have the same y-ranges for consistence and readability Fig. 11 Consider removing the artefacts you mention (P5847 L21-23) in the first AOD bin Figure 12 avoid overlapping legends with text and data points

P5833 L1 "quantifies" should be "quantify" P5835 L22 probably a missing word: "... is the third European ..." P5841 L18 "represents" should be "represent" P5842 L17 "by doing" could be more standard language: "by considering"

Section 4.2 discusses trends inconsistently. Table 6 shows that all trends are negative, while they have no negative sign in text, e.g. P5841 L18-20 and PP5845 L5. P5844 L28-29 says slopes are larger for the periods ending in 2009 than 2011, while table 6 shows they (PM10 and PM2.5-10) are smaller (more negative).

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 5829, 2014.