

## ***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 #1**

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#### General comments:

The paper presents analysis of EMEP PM and AERONET AOD datasets to discuss the occurrence of dust events in the north-central area of Spain. The analysis is thorough but not convincing. The influence of dust on the variability of ground or column aerosol concentration is more speculative than clearly demonstrated. I agree with reviewer 1 that lidar data should be used to investigate the relationship between AOD and PM ground concentration. Also, some AERONET inversion products such as size distribu-

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tion or asymmetry parameter could give insights into potential dust intrusion over this area. Also, larger scale data from satellite sensors could give some information on the south-north dust gradient.

#### Specific comments:

P5830 L24-25: Health impact of particles also depends on their chemical composition.

Figure 2: PM<sub>10</sub> and AOD variations are sometimes anti-correlated. Why ?

P5842 L7-15: Inversion of the slope is not clear.

P5842 L19-23: the methodology used to detect dust intrusion should be detailed.

P5843 L1-3: Please add some explanations for the correlation between NAO index and PM trend

P5846 L16-18: How this classification has been obtained ?

P5848 L11-14: An illustration with a case study could be useful.

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