

## ***Interactive comment on “Trends of particulate matter (PM<sub>2.5</sub>) and chemical composition at a regional background site in the Western Mediterranean over the last nine years (2002–2010)” by M. Cusack et al.***

**Anonymous Referee #2**

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Review of ‘Trends of particulate matter (PM<sub>2.5</sub>) and chemical composition at a regional background site in the Western Mediterranean over the last nine years (2002-2010)’ by M. Cusack, A. Alastuey, N. Pérez, J. Pey and X. Querol a manuscript submitted to Atmospheric Chemistry and Physics.

General comments: The study focuses on trends of PM<sub>2.5</sub> level and chemical composition over the Spain from 2002 to 2009. Aerosol samples are obtained from the city of Montseny using quartz fiber filters and high volume sampler. Major water-soluble ions (sulfate, nitrate and ammonium), organic and elemental carbon, major and trace

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elements are measured. Decrease in the PM<sub>2.5</sub> level and change in the chemical composition are attributed to implementation of emission abatement strategies enforced by EU, change in meteorological parameters and economic recession. In this respect, it may be the interest of scientific community. As a result, I suggest acceptance of the manuscript (please see the comments below).

Specific Comments

Abstract:

Page 10996, Lines 12-13: It would be useful for reader if the manuscript supplies percentage of decrease (as a range) in PM<sub>2.5</sub> over Europe during study period after the words ‘varying degrees’.

1. Introduction:

Page 10997, Line 11: Please give the concentration ( $\mu\text{g m}^{-3}$ ) for PM<sub>2.5</sub> limit value established by EU directive.

Page 10997, Line 26: Please supply ranges after ‘varying degrees’.

2. Methodology:

Pages 11000, Lines 25-28-11001, Lines 1-14: It would be interesting for reader to have information about blank contributions from quartz filters for OC/EC, water soluble ions and particularly for major/minor elements.

3. Results and Discussion:

3.1 Mean PM<sub>2.5</sub> levels:

Page 11003, Lines 3-8: Please write a short explanation about possible reasons of observed difference among the RB sites across Europe.

3.3 PM speciation:

Page 11006; Lines 12-13: 19 % of the observed PM<sub>2.5</sub> mass is found to be as unac-

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counted and this portion ( $\sim 2.4 \mu\text{g m}^{-3}$ ) of PM<sub>2.5</sub> mass is related to water retention on Quartz filters. Contributions on observed PM<sub>2.5</sub> mass are calculated applying mass closure. A number of researchers in the area have shown that mass closure approach exhibits the largest unidentified fraction compare to APFA and PMF. This discrepancy has been attributed to its simplicity and lack of its ability to extract additional aerosol sources. In addition to water retention on filters please consider these peculiarities of mass closure.

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