

## ***Interactive comment on “Trends and variability of atmospheric PM<sub>2.5</sub> and PM<sub>10–2.5</sub> concentration in the Po Valley, Italy” by A. Bigi and G. Ghermandi***

**Anonymous Referee #2**

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This manuscript provides interesting information on the trends and variability of atmospheric PM<sub>2.5</sub> and PM<sub>10–2.5</sub> over a range of 7 to 10 years for the Po Valley, Italy. It is a worthwhile complement and addition to their previous study (Bigi and Ghermandi, 2014), which dealt with PM<sub>10</sub> in the Po Valley. The approaches used in this manuscript and the results obtained are of value for other researchers, who are performing or intend to start similar studies in other regions in Europe. However, as indicated below, the current manuscript still has some shortcomings, so that revision is needed before it can be published in ACP.

Specific comments:

1. The language and grammar are better than in the previous version, but additional improvement is needed. As one example, the authors made on a number of occasions

C1

use of the word "resulted" in a rather awkward way. Under Technical corrections below, it is indicated where rewording is needed or suggestions are given for improvement. Furthermore, as I already stated in my quick report, to my taste, the definite article ("the") should be used much more often throughout the manuscript. Many cases are given under Technical corrections below where the use of "the" is recommended.

2. It should be indicated in the abstract that the current study deals with data sets, which range from 7 to 10 years.

3. Page 9, lines 3-4: If I understand the text correctly, the authors state that biomass burning is a large source of both primary and secondary OC and to make this point they provide Perrone et al (2012) as reference. However, I failed to see in this reference that it is claimed that biomass burning is a large source of secondary OC. Clarification is needed here, e.g., by providing one or more appropriate references, or otherwise the statement about secondary OC should be removed.

4. Technical and other (mostly minor) corrections:

- page 1, line 4: replace "improvement on" by "improvement in".
- page 1, line 8: replace "these showed" by "this showed".
- page 1, line 9: replace "have been tested" by "were tested".
- page 1, line 18: replace "have been" by "has been".
- page 2, line 1: replace "lead to" by "led to".
- page 2, line 4: replace "for trends" by "for the trends".
- page 2, line 6: replace "resulted for" by "were obtained for".
- page 2, line 10: replace "impacting on local" by "impacting local".
- page 2, line 22: replace "follows the" by "follow the".
- page 2, line 25: replace "sampled at" by "obtained from".

C2

- page 2, line 28: replace "Sites are" by "The sites are".
- page 2, line 31: replace "Authors have" by "The authors have".
- page 3, line 21: replace "have been performed" by "were performed".
- page 3, line 27: replace "25 %" by "25%".
- page 3, line 34: replace "and analysis" by "and the analysis".
- page 4, line 3: replace "to the companion study, trends" by "to in the companion study, the trends".
- page 4, line 4: replace "by Theil-Sen" by "by the Theil-Sen".
- page 4, line 8: replace "by TS method and its significance was tested by non-parametric bootstrap, similarly to annual" by "by the TS method and its significance was tested by a non-parametric bootstrap, similarly as for the annual".
- page 4, line 12: replace "TS method was used to estimate also trends in emission inventory data, along with non-parametric resampling to asses slope" by "The TS method was used to estimate also trends in the emission inventory data, along with non-parametric resampling to asses the slope".
- page 4, line 27: replace "by multiple-taper" by "by the multiple-taper".
- page 5, line 26: replace "Trend component" by "The trend component".
- page 5, line 28: replace "to GLS trend" by "to the GLS trend".
- page 5, line 29: replace "in annual series" by "in the annual series".
- page 6, line 11: replace "occurred in" by "occurring in".
- page 7, line 19: replace "mainly upon" by "mainly from".
- page 7, line 21: "resulted three or two depending" is unclear; rephrasing is needed.

### C3

- page 7, line 23: "resulted more internally homogeneous" is unclear; rephrasing is needed.
- page 7, line 33: replace "source in" by "sources in".
- page 8, line 9: replace "6.9 %" by "6.9%".
- page 8, line 14: replace "-1 to ~ -8 %" by "-1% to ~ -8%".
- page 8, line 14: "resulted steepest for" is unclear; rephrasing is needed.
- page 8, line 22: replace "These latter estimated" by "The latter authors estimated".
- page 8, line 24: replace "in Milan metropolitan area. According to Lombardy" by "in the Milan metropolitan area. According to the Lombardy".
- page 8, line 26: replace "Lombardy resulted" by "Lombardy resulted in".
- page 8, line 28: replace "levels are potentially" by "levels is potentially".
- page 9, line 6: replace "at Ispra EMEP site over 2004–2010. This trend was explained with an" by "at the Ispra EMEP site over 2004–2010. This trend was explained by an".
- page 9, line 7: replace "originated by an" by "originating from an".
- page 9, line 8: replace "urban might" by "urban ones might".
- page 9, line 10: replace "Finally, results" by "Finally, the results".
- page 9, line 14: replace "around year" by "around the year".
- page 9, line 15: replace "decreased of" by "decreased by".
- page 9, line 16: replace "where trends" by "where the trends".
- page 9, line 17: replace "is worthnoting" by "is worth noting".
- page 9, line 21: replace "and worthnoting" by "and worth noting".

### C4

- page 9, line 26: "resulted highest in" is unclear; rephrasing is needed.
- page 9, line 29: replace "events occurred" by "events which occurred".
- page 10, line 3: replace "occurred on the" by "which occurred on the".
- page 10, line 6: replace "and results" by "and the results".
- page 10, line 10: replace "by Theil-Senon method on annual quantiles and by TS method" by "by the Theil-Sen method on annual quantiles and by the TS method".
- page 10, line 26: replace "responsible of the" by "responsible for the".
- pages 11-13, References: abbreviations in journal names should end on a dot (.)..
- page 16, second line of Table heading: replace "95 %" by "95% confidence level".
- page 17, second line of caption Figure 1: replace "of cluster" by "of the cluster".
- page 17, third line of caption for Figure 1: replace "resulted an outlier and was not included in this classification. Results of cluster" by "resulted in an outlier and was not included in this classification. Results of the cluster".

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