Atmos. Chem. Phys. Discuss., 13, C4830–C4833, 2013
www.atmos-chem-phys-discuss.net/13/C4830/2013/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Impact of the North Atlantic Oscillation on the variations of aerosol ground levels through local processes over Europe" *by* S. Jerez et al.

Anonymous Referee #1

Received and published: 16 July 2013

The paper aims to investigate the impact of the North Atlantic Oscillation (NAO) on the variation of ground level concentration of locally emitted aerosols during the winter and summer seasons over Europe. The climatic impact of the NAO is reviewed in the context of the modeling system to provide for model validation. The impact of the NAO on aerosol concentrations is investigated as the difference of high/low NAO index composites, with the aim to link the large-scale teleconnection pattern to natural local-pollution variability. Overall the paper is relevant, focused and concise. Some changes are needed for the standard required by the journal.

General Comments:

The original time-series of winter monthly values of the NAO index presents a positive trend over the last 30 years. Therefore its distribution is dominated by positive values, leading to late winter averages above zero. It's my understanding that this is taken into account for the present study but needs to be elaborated upon. How were the 30/70 percentiles defined? Was the distribution normalised to zero mean, unit standard deviation over the period studied? This information should be included in the text.

As the NAO index from NCEP/NCAR Reanalysis Project (CDAS) is used in the study, but ECMWF (re)analysis data are used to drive the model, how well do the two datasets agree on the NAO index? What is the uncertainty of this onz the results? Why not calculate/use the corresponding NAO index from the ECMWF data instead?

Though it is mentioned, it should be made more clear in the text and abstract that varying emissions are used for the validation of the model, but emissions fixed to the year 2005 are used to draw conclusions on the NAO impact on ground aerosol concnetrations.

Individual comments:

Throughout the paper "NAO-impact" → "NAO impact" (Remove hyphen).

Comments below are prefixed with the page and line number:

Abstract:

Emphasis needs to be added in the abstract that the study is on the seasonal time scale with climatological monthly-averaged emissions based on the year 2005.

l.1: This contribution assesses → We assess

l.1: non-anthropogenic → non anthropogenic-induced

l.10: "Variations are up to and over 100% for most aerosols": Needs rephrasing, to be made more specific

Introduction:

p13891 l.7: remove paragraph break

p13892 l.7: is extesive to → extends to

p13892 l.17: aerosols → aerosol

p13892 l.29: Remove "Besides,"

Sec 2:

p13893 l.10: driven by ECMWF data: Are (re)analysis data used as boundary conditions or is the model nudged towards the data throughout the domain? It should be made clear in the text that the model produces its own meteorology.

p13893 l.12,13: Why is gas-phase chemistry included/mentioned? The paper deals with aerosols only. This is confusing for the reader.

p13894 l.17-22: Sentence beginning "Although the influence...", ending "... related to the NAO phase." is too long-winded and very hard to understand. Needs to be rephrased to clarify the meaning.

p13894 l.19: "hampers" is erroneously used. Should be replaced with eg. "is unable"

p13895 l.8: Remove "and that task constitutes the focus of an on-going paper"

p13895 l.10: "it is opportune to show shortly" → "it remains to be demonstrated"

p13895 l.15: For the sake of brevity → For brevity

p13895 l.16: under several → under two

p13895 l.18: As well → Also

p13895 l.21: Remove "the worst"

p13895 l.26: arises → is

p13896 l.6: Remove "is relevant as it"

Section 3:

p13896 l.17: "with very similar structures within each season considered but very different in each one of them" needs rephrasing for clarity

p13896 l.19: being disregarded → are not included

Section 4:

p13898 l.12: have associated → are associated with

p13900 l.14: "not counteracting by enhanced temperatures" is unclear

Conclusions:

p13902 l.15: "Should not be considered deterministic". In what context is deterministic used here? Please consider rephrasing.

Figures:

Fig 2 caption: up → top having been highlighted → highlighting

Fig 3: a,b) Panels are too busy; please consider reducing vector density. Vector magnitude scale missing from the label.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 13889, 2013.