

The paper is discussing a very important topic on trend analysis by model inter-comparison of the air quality in the past decade. In general the paper is very relevant and a first step into a more holistic assessment of specific air quality situations.

Anyway the structure of the paper is not quite clear and some questions arise which have to be taken into account for final publication.

General Comments

The paper opens with a clear statement to "...discuss the capability of current state-of-the-art chemistry and transport models to reproduce air quality trends...". But in the first chapter the emphasis was on an extensive discussion of the quality and quantity of available air quality station data. This is an important issue, but not in such an extensive discussion in the frame of this paper. Already this chapter might be worth to write a single paper out of it. It is not clear why such emphasis was put on the data analysis.

Also the chapter is not at all in relation to the discussion about the emission inventory which was discussed within three small paragraphs. As one of the most important input for modeling exercises a deeper discussion on the emission inventory is necessary, including a discussion about the inhomogeneity across national levels.

The discussion of the models is adequate and all necessary references have been made. Also the behavior of the models in relation to measurement data was discussed sufficiently.

At the end of the paper the discussion found a short end. The readers expectations was not fulfilled in the way, that there was no discussion about "the capability of the models", which was addressed in the beginning. What are the main advantages/disadvantages of the models. Why did one model perform well and the other not? What are the physical and chemical parameterizations behind, etc. Actually there was one short comment about the performance of the models on page 19055, line 8 about the "degree of photochemical activity".

Anyway if the authors reduce the first chapter on data assessment and include a chapter of model discussion about their strengths and weaknesses the paper is looking forward to have deep and comprehensive discussion on past air quality trends derived by modeling exercises.

Additional Comments

Emissions from ships have been discussed during several occasions. The increase of pollutants on ship tracks is quite evident as we can see in the figures. The question is, if this increase is based on the increase the numbers of ships or just because of the increase of the knowledge and awareness of ship emissions in the recent past. In section 5.1 this is discussed but the explanation is far too weak. Some investigations on ship numbers and emissions might be very helpful.

Detailed Comments

- As most of the model names are abbreviations all model names should be written in CAPITAL letters – even in headings of chapters.
- Also "AIRBASE" is not in CAPITAL letters throughout the text

- Some references are missing in the reference list:
 - o Page 19032, Line 10: EC (2001)
 - o Page 19040, Line 10: Granier et al (2011)
 - o Page 19042, paragraph 3.2.5 please check the references; some of them are not listed
 - o Page 19055, Line 4: Valari and Menut (2008)
 - o Page 19068, table 3: Van Der Werf et al (2006)
 - o
- Page 19035, Line 2: I think in Europe we should avoid the expression “megacities” → better “urban agglomerations”. As maybe apart from Istanbul we do not have a real megacity in Europe
- Page 19038, Line 5: metrological → meteorological
- Page 19043, Line 9: Figure 4a → Figure 4
- Page 19050, Line 9: “..except for Spain and France..:” – but this is also true for Spain, Portugal and France.
- Page 19051, Line 13: delete the first “de” in “...de de-seasonalised...”
- Page 19054, Line 21: “...demonstrate the potential and imitations of existing models...” → as mentioned above, this part is not really visible in the paper
- Page 19054, Line 21: “...demonstrate the potential and imitations of existing models...” → as mentioned above, this part is not really visible in the paper
- Page 19063, Line 27: Skamarockl → Skamarock

Figures:

Fig. 1: The information of the figure is quite enormous, but nevertheless the figure is hard to read and the dots are hard to differentiate by using paper copies. By increasing the magnification of pdf file to at least 300 % the figures become more visible.

Fig. 4: It might be advisable to split the figure in a) urban background, b) suburban and c) rural in order to catch the information easier

Fig. 8, 10, 12: the same holds true for these figures