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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Summertime impacts of Eastern Mediterranean megacity emissions on air quality" *by* U. Im and M. Kanakidou

Anonymous Referee #3

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This manuscript presents results of an air quality modelling study for the eastern Mediterranean region enclosing the metropolitan areas of Athens and Istanbul. The study is based on a WRF-CMAQ modelling system coupled with emission inventories at regional and local scale and MEGAN for the biogenic component. A number of different emissions scenarios were run to evaluate the impact at regional and local scale of Athens and Istanbul emissions during summer. Certainly, the relationship between air quality and emissions at regional scale is a topic of great interest for the scientific community and environmental stakeholders that deserves a strict scientific analysis. Unfortunately, according to this reviewer this study does not provide relevant information about this issue. A detailed analysis based on field observations and modelling simulations is needed to understand such complex phenomena.

The manuscript needs a considerable revision to provide useful information to the community. The authors need to evaluate the convenience of publishing such particular application of a modelling approach that has been already published in previous articles. The manuscript makes reference to another five publications based on the same modelling system and data for the same region. The current manuscript could be more suitable for a local or internal publication than for a journal such as ACP.

Some major comments are:

- To provide useful information any modelling study needs to evaluate its results with field observations. The manuscript does not present any modelling evaluation. Modelling uncertainties may be higher than the reported differences between scenarios.

- The section describing the methodology and input data is very brief. The authors refer to the reader to at least seven additional articles for basic information about the modelling system and emissions data, which is not practical.

- A description of the meteorological conditions during the simulated period is needed. Is the selected period representative of typical meteorological conditions during summertime?

- More information about the emissions used as input data is needed. Which methodology was used for the chemical characterization of the emissions (e.g. VOCs speciation)? Which photochemical mechanism was used?

- Which is the influence of other large urban areas (e.g. Thessaloniki) in the modelled region?

- Better assumptions are needed for the scenario simulating a hypothetical decentralization of both cities. For example, cities extend following certain urbanization and economic patterns, and not arbitrarily. As cities grow or extend, changes in emissions are expected (e.g. transportation), and therefore the actual emissions cannot be just "re-distributed" in a larger area.

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Interactive Comment

- The use of many acronyms and percentages to describe the modelling results makes difficult the manuscript reading. Some editorial mistakes complicate also the results understanding, for example: Page 26667, lines 20-21. There is a big difference between 2.92 ppb and 25 ppb. Page 26674, line 19. A maximum contribution of 100% could be expected, but not a contribution of 229%.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 26657, 2011.