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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Isolating the climate change impacts on air pollution-related-pathologies over Europe – A modelling approach on cases and costs" *by* Patricia Tarín-Carrasco et al.

Anonymous Referee #1

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This work described the climate change impacts on air pollution-related-pathologies over Europe with a modelling approach on cases and costs. Although this study provides important results and is well written, there remain some concerns in the current manuscript. It would be important to restructure the paper in results/discussion/conclusions, since in conclusions some aspects were discussed, and instead where it should have been discussed in discussion I cannot find almost anything. I strongly recommend the authors to include a limitation section about the applied methods for the epidemiological relationship and modelling of the climate change

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Discussion paper

scenarios. For instance, at this moment in many regions traffic restrictions are being strained to reduce the pollution exposure.

Major comments:

Pag 2. Line10: I'm missing an important reason. The main issue with pollution is the spatio-temporal variability from local to global scales.

Pag 3. Line 10: "Héroux et al. (2015) suggest that mortality risk associated to air pollution can be reversible on a short period."

In this context, it would be important to difference short and long-term effects. In addition, it cannot be ruled out that reducing the potential exposure also could reduce the risk regarding long-term effects, i. e., the human body can partially recover.

It is also important to highlight that the cost for the health system of the impacts with lower severity and greater population affected can overcome of those situations that have a greater seriousness but a smaller affected population (EEA 2013. Environment and human health, Joint EEA-JRC report Nr 5 Report EUR 25933 EN).

Another aspect would be the vulnerable groups (elderly, people with chronic diseases and children). In an aging society, even if the exposure were reducing, more people would be at risk and vulnerable in the future.

Pag 3. Line 16: Why you use only scenario (2071-2100, RCP8.5)? See Fig. 4 from https://www.atmos-chem-phys.net/18/15471/2018/acp-18-15471-2018.pdf

It could be interesting and useful to include a similar Figure as 5 from the same paper above. The projected changes by different regions in mortality and pollution.

Pag 3. Line 31: Which method you used for detrending? Usually in time series regression, you have to control cofounder variables as temperature, which has significant effects on mortality simultaneously.

See Bhaskaran et al. (2013). Time series regression studies in environmental epi-

demiology. 10.1093/ije/dyt092 and Analitis et al. (2018). Synergistic Effects of Ambient Temperature and Air Pollution on Health in Europe: Results from the PHASE Project. https://www.mdpi.com/1660-4601/15/9/1856

Pag 4. Line 10: Which is your study area? If Europe, than why you only use most of southern and central Europe?

Pag 5-6. 3.1: Can you discuss with more detail the absence of correlation in some countries, which could be also due to the high spatio-temporal variability and methods issue (in comparison with local epidemiological studies). Discuss limitation of methods in another point and compare you results with city-specific studies.

Pag 15. Line 30: "we should bear in mind the aging of European population and the increase of city dwellers, variables that have not been taken into account in this study in order just to isolate the effect of climate change alone in the health of European citizens."

This is an important aspect and you should discuss it with more detail, in particular, which consequences has this for your results and the limitation of not including a population projection.

Minor comments: Maps. I would suggest using a different projection for Europe. For example, “+proj=laea +lat_0=52 +lon_0=10 +x_0=4321000 +y_0=3210000 +ellps=GRS80 +units=m +no_defs”

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