

## ***Interactive comment on “Aerosol exposure versus aerosol cooling of climate: what is the total health outcome?” by J. Löndahl et al.***

**Anonymous Referee #2**

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The manuscript aerosol exposure versus aerosol cooling of climate: what is the total health outcome written by J. Löndahl and co-workers presents an interesting topic for future regulations of emissions from different anthropogenic sources. However, as pointed already out in detail by referee #1 the way it is presented is shallow and too simplified without enough scientific foundation. In its present version I would recommend not to publish this paper in ACP. By not repeating all the detailed comments from the first referee - which I agree - I will only add some comments which should also be considered in the progress of this manuscript.

The authors discuss the change of aerosol by decreasing the ship emission and mention that SO<sub>x</sub> is contributing to particle formation processes which cool the atmosphere through direct reflection of light and increased cloud cover. Until now it has not been

C5877

proven that sulfur compounds are directly responsible for the atmospheric nucleation processes and although many scientists use in their model simulations sulfuric acid as the crucial parameter to simulate new particle formation there are many open questions like the role of organic molecules in the particle formation processes. Will the number concentration of particles with direct influence on the first and second indirect aerosol effect really drop down when we decrease e.g. SO<sub>2</sub> emissions or go up when the emissions of volatile organic compounds increase like it is predicted by many scientists.

This is only one topic out of many which are treated by the authors in a very simplified way with huge impact on the overall outcome. The title of the manuscript (although it is not correct as already mentioned by referee #1) promises the reader an interesting and important article about possible anthropogenic influence for our future climate, but the manuscript in its current version could not be accepted as a scientifically relevant reflection of our knowledge up-to-date. Thinking about the complexity involved in this topic and the immense variety of publications and scientific work already published which should be considered I for myself would not believe to be able to somehow combine a manuscript on this subject and it should not be done in an incomplete and shallow way.

Special comments: Page 15058, line 5: In addition low concentrations of particulate matter, as in most populated areas, ... is it really the case that we have low PM values in most populated areas or does the author mix something up here?

Page 15065, line 11: The interaction between aerosols and climate is considered to be low or medium to low by IPCC (Fig 1). It is not the interaction but the level of scientific understanding which is low or medium to low.

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Interactive comment on Atmos. Chem. Phys. Discuss., 10, 15055, 2010.

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