

Interactive comment on “Modeled global effects of airborne desert dust on air quality and premature mortality” by D. Giannadaki et al.

Anonymous Referee #3

Received and published: 9 December 2013

The manuscript “Modeled global effects of airborne desert dust on air quality and premature mortality” by Giannadaki et al, is bringing a well written presentation of a large amount of computational information derived from model based estimates of the effects of desert dust particles of less than $2.5 \mu\text{m}$ on premature mortality. In Introduction, the last paragraph should clearly state the aim of the study and not just describe what the authors did in this paper. Also in Introduction, a better categorization of the epidemiological studies that relate airborne particles to cardiorespiratory outcomes (time series, prevalence studies) and lung cancer (prevalence studies) should be attempted, to give the reader a better picture of the currently available evidence. It will also be useful to state from introduction that only a few studies examined desert dust particles associations with cardiorespiratory outcomes and none with lung cancer and that

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the only metric they used was the dust particles mass and not chemical constituents. In Discussion, the limitations relating to the weaknesses of using health impact estimates of all origin particles in a study of natural dust particles health effects should be clearly stated and discussed. In this sense this paper by providing modeled estimates of natural dust health effects has the same weaknesses as the epidemiological studies that looked into cardiorespiratory (mainly) mortality and used particle mass as the only metric of exposure. Overall, authors should justify how it is physiologically plausible to use in this study health impact estimates for lung cancer development derived from epidemiological studies on all particles effects. How can they support that the different chemical constituents of primarily anthropogenic particles in US studies can apply in the case of natural dust particles in the case of lung cancer development and related mortality across the globe. If they cannot answer this issue convincingly, it would be better to remove estimates concerning lung cancer mortality.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 24023, 2013.

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