Atmos. Chem. Phys. Discuss., 12, C7416–C7417, 2012
www.atmos-chem-phys-discuss.net/12/C7416/2012/


Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "Impact of 2000–2050 climate change on fine particulate matter ($PM_{2.5}$) air quality inferred from a multi-model analysis of meteorological modes" *by* A. P. K. Tai et al.

**Anonymous Referee #2**

Received and published: 25 September 2012

General comments This paper presents effects of future climate changes on PM2.5 air quality in the US by using multi-model ensemble datasets with the statistical metric of PM2.5 sensitivity to a dominant meteorological variable based on the long-term observations. First of all, this paper is concise, clear and well written. The method to estimate future climate effect on PM2.5 is also new and well defined. In particular, the purpose of this work to reduce simulated uncertainty in typical GCMs by using observational constraints might be well recognized and provide means to evaluate many modeling works to strive for quantifying future changes. I would recommend the paper accepted but with a few clarifications that need to be addressed.

This work first obtained the metric, dPM/dT, using the past observations and applied to the future by multiplying it with simulated dT from models. In this calculation, authors assume that dPM/dT will not change in the future. It may be or may not be. This is also another issue to be investigated. Is there any assertion to support this assumption? Or elaboration on this could be much welcomed including resulting errors or uncertainty in the estimates.

In the similar context, this work analyzed the past observations and suggested cyclone activity as a dominant meteorological factor affecting PM2.5 air quality. Is there any possibility for this to change in the future?

Specific comments p18113, L21: Each model has its own grid resolution with different dynamic scheme. I wonder there would be any issues for the regridding such as losing fine-grid structure in defining cyclone activity and so on. p18114, L1: Authors chose median instead of mean. Any reasons? p18116, L4: Any insight for the fact that the west shows less clear physical meaning? I wonder cyclone activities will be much less in the west than the east. Can this be a factor? Fig 2: low panel shows one in the southeast and one in the southwest with dark red color indicating high PM2.5 sensitivity wrt cyclone period. Is this real? What do these imply?

---

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 18107, 2012.