

## ***Interactive comment on “Projected Changes in Haze Pollution Potential in China: An Ensemble of Regional Climate Model Simulations” by Zhenyu Han et al.***

**Anonymous Referee #2**

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The authors examined the future haze pollution potential through downscaling three CMIP5 global models with the RCP4.5 scenario. The authors suggested that the air environment carrying capacity (AEC) tends to decrease and the annual weak ventilation days (WVD) tends to increase over large fraction of China in the future. Based on the AEC and WVD values, the probability of haze pollution risk over the Beijing-Tianjin-Hebei and Yangtze River Delta region increase in winter. Over Northeast China, the haze pollution risk will increase due to the decrease in AEC and increase in WVD.

1. My main criticism of this study is that the authors did not consider the impacts of reduced emissions in the future under RCP4.5 scenario on pollution risk. The haze pollution risk should relate to the aerosol concentrations. For example, higher background

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concentration lead a higher pollution risk with the same AEC. Thus, a discussion about how the pollution risk changed due to changes in emission is at least needed.

2. Line 124- In the equation (1), how could authors distinguish the intensity of rainfall? The wet deposition with 10 mm/hour (and no precipitation in other 23 hours) should be different with 10 mm/24 hour.

3. Line 175-176 Why the AEC is underestimated over the southern Xinjiang and overestimated over parts of North China? Which one is the major reason? Simulated precipitation, wind speed, or boundary layer depth?

4. Line 217- “Southwest China, northern North China, Northeast China...” A map is needed.

5. Line-304-306. Missing WVD bar in Fig.7b in JJA during the middle of the 21st century.

6. Line 364- Change “dominant” to “important”. I don’t think the annual 20%-30% could be described as “dominate role”.

7. Line 392-400. In addition to the wind speed and boundary layer depth, will the wind direction change in the future? Does it also have impact on the air environment carrying capacity and haze pollution potential?

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