

## ***Interactive comment on “Assessment of China’s virtual air pollution transport embodied in trade by a consumption-based emission inventory” by H. Y. Zhao et al.***

**Anonymous Referee #3**

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The authors estimate the air pollutants embodied in interprovincial and international trade for China using an input-output approach. The fraction of emissions embodied in interprovincial trade are similar in magnitude to the fraction in international trade. While the interprovincial results appear to be a new contribution, the manuscript should be rewritten to distinguish this study from previous work.

Major Comments

\*The introduction in the manuscript does not identify the unique contribution of this study. In particular the Lin et al. (2014) study appears to have done something very

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similar. The present manuscript needs to identify the differences in approach from previous work and provide evidence as to why these differences are important and worth investigating. It seems that this might be that the study adds a province-level analysis... but this needs to be stated and its importance needs to be justified.

\*The results that 15-23% of emissions are embodied in foreign trade is very similar to the 17-36% reported in Lin et al. (2014) so perhaps this is not a new results and should not be highlighted in the abstract.

\*\* However, if the response is to shift industry out of these cities without changing consumption patterns, the result of the regulations may be an increase in the total amount of pollution emissions and little or no improvement in air quality, since there will be an increase in emissions through transportation along the geographically extended supply chains and also because that the general low efficient production in less regulated areas." This sounds like a critical motivation for this study but the opposite may be true. If consumption stays the same but emissions are shifted out of megacities then that would have two effects to reduce the impact of air quality. First, the emissions might be more dispersed in space which would dilute the concentrations. Second, the emissions would be further from the high population densities which would result in dilution from atmospheric mixing and reduce exposure impacts. Its not clear to me if the increase in transportation of goods and the less efficient production in less regulated areas would be more important or less important than the factors that I mention above. To investigate this trade-off you would need to include a health assessment model (e.g. BENMAP).

Minor Comments

\*editing needed throughout manuscript. e.g. in abstract edit to " by using a consumption-based accounting approach "

\*\* These particles are known..." Previous sentence is talking about gases and particles so might need to rewrite in this sentence "The primary PM2.5 particles..."

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\*The results that 15-23% of emissions are embodied in foreign trade is a bit lower than the 17-36% reported in Lin et al. (2014). The discussion section should include some reasons for this difference.

\*\*Allow for the embodied emission from other regions, the pollution embodied in these regions' products exports accounts more (68–75 %)." Please rewrite.

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Interactive comment on Atmos. Chem. Phys. Discuss., 14, 25617, 2014.

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