

# ***Interactive comment on “Observation of regional air pollutant transport between the megacity Beijing and the North China Plain” by Yingruo Li et al.***

## **Anonymous Referee #2**

Received and published: 8 July 2016

Overall Comments: The authors discuss regional air pollutant transport between Beijing and the North China Plain using a 26 1/2 month data set of meteorological parameters and trace gas concentrations. They have a compelling data set and display it with some well chosen plots. However, more rigorous seasonal analysis of the measurements is needed before this paper is publishable.

General Comments Figure 1: To aid the geographically challenged, add topography (mountains), heavily industrialized and urban areas, Gucheng, Baoding-Cangzhou, and Tianjin-Tangshan to Figure 1.

Figure 2 (Section 3.1) could be replaced by a trace gas version of Figure S2.

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Figure 3: In order to strengthen the analysis, you need to separate the data set into seasons. After doing that it will be easier to interpret the results.

Trace gas lifetimes vary seasonally and it is unclear what an annually average lifetime means.

I would move S2 and S3 to the main body of the paper.

Other Comments: L52: together with → together with a

L83: Models-3/CMAQ model → CMAQ L82/83: up to 26% and 15% of what? up to 60% of what? L89 about 32%, 11%, and 3.5% of what?

L118: Ox wasn't measured.

L168-174: This detailed information should be moved to supplemental material and included in the caption for Figure S1.

L180-182: In order to aid in comparison with other studies, give annual means for each trace gas as opposed to the average over a 26 1/2 month period. You can still give the hourly standard deviations but weight them too so that they are not overly influenced by the 2 1/2 month period with 3 years of data.

L183/184: observed concentrations of these gaseous pollutants were comparable to reported results This statement is too vague to be of use.

L194-196: It should be clarified ...270 to 360 degrees. Move this to the caption for Figure S2. This text detracts from the flow of the manuscript.

L205-2011: You need to be more rigorous with your analysis here. You can do better than "Generally, the south wind prevailed in the second half of the year ..." and "variations in RH and T were ... typical".

L207: The seasonal variations

L274: Was the reduction in emissions region-wide or mostly in the greater Beijing area?

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L278-288: Be careful here, yes NO is short-lived but it is also re-generated from NO<sub>2</sub> as part of the NO<sub>x</sub> family.

L307: The lifetime of SO<sub>2</sub> is not 17 days. Please double check and adjust discussion accordingly.

L313: essential source → major source

L323: Beijing area closely → Beijing area are closely

L329: transport of SO<sub>2</sub>, CO<sub>2</sub>, ... were → transport of SO<sub>2</sub>, CO<sub>2</sub>, ... was

L344: the transport direction → the net transport direction

L384: You need to add more detail here rather than stating that fluxes were lower in 2008 than 2007. For example, the decrease in summertime CO and NO<sub>x</sub> fluxes between 2007 and 2008 is on the order of a factor of 5.

L401-404: You need to convince the reader that the use of surface winds and trace gas concentrations at one site is sufficient to calculate the flux of a trace gas between the two regions.

L417: The conclusion section is too similar to the abstract. Expand it a bit.

Figure S2 caption for BP should be hPa.

In order to aid the reviewer, please order the wind rose plots as follows (you can then compare similar seasons easily). a: Autumn 2006 b: Autumn 2007 c: Winter 2006/07 d: Winter 2007/08 e: Spring 2007 f: Spring 2008 g: Summer 2007 h: Summer 2008

Domain for Figure S4 should match that for Figure 1. Add location of Beijing.

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