

## ***Interactive comment on “Analysis of aircraft and satellite measurements from the intercontinental chemical transport experiment (INTEX-B) to quantify long-range transport of East Asian Sulfur to Canada” by et al.***

**Anonymous Referee #1**

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This paper discusses the observational data of aircraft, satellite and also ground measurements during the INTEX-B aircraft campaign period comparing with global CTM output. The main focus of discussion is the quantification of long-range transport of East Asian sulfur to Canadian coast. The subject is very much relevant to the scope of ACP.

Although the paper includes much of interesting data, the present referee thinks the paper has several weak points which have to be overcome before it goes to ACP. The major point of dissatisfaction is that more solid quantitative conclusion has been

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deduced from satellite and ground based data rather than the aircraft measurement in spite of the authors intention that the paper is to be one of the output of INTEX-B campaign.

1. One quantitative conclusion is in Fig. 5 (bottom two panels), which demonstrates that satellite data from both MODIS and MISR shows clear increasing trend of AOD during the period of 2000 and 2007, and it is well correlated with the increase of SO<sub>2</sub> emission in China (Region 1). In the upper panel of Fig. 5 comparison is made between AOD from MODIS and MISR with GEOSS-Chem simulation.

2. In Fig. 5 top panels why the GEOSS-Chem simulation gives more evenly spread AOD distribution than satellite data? Does simulated AOD includes BC/OC also? Since the aerosol pollution in China is generally heavily affected by biomass burning (agriculture waist burning), the attention should be paid to the contribution of BC/OC in addition to sulfate and dust throughout the paper whenever intercontinental transport of AOD is discussed. If only sulfate and dust are transported from East Asia and not for BC/EC, discussion should be made on this.

3. Another quantitative conclusion is shown in Fig. 11, which demonstrates that the ground measurement data of sulfate from Canada's National Air Pollution Network sites are well correlated with percent Asian sulfate simulated using the GEOS-Chem model. It should be discussed that why this very clear relationship can be expected in spite of the fact that East Asian sulfate is mostly transported in 2-6 km layer as seen in Fig. 10.

4. In Fig. 6 why the model always overestimates (often by a factor of two) the aircraft observation for sulfate? Is there any possibility that Asian contribution is overestimated for some reason? Such discrepancy is not well discussed in the paper. Comparison between aircraft data and model presented in Fig. 6, 7 and 9 do not provide very useful information in this paper. More deep discussion or analysis is necessary if those figures are included these in the paper.

Overall, if the paper contends to be a part of INTEX-B output, more quantitative dis-

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cussion on the discrepancy between the observation and GEOSS-Chem model is necessary.

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