

Interactive
Comment

Interactive comment on “Source-receptor relationships between East Asian sulfur dioxide emissions and Northern Hemisphere sulfate concentrations” by J. Liu et al.

Anonymous Referee #3

Received and published: 13 May 2008

Review of "Source-receptor relationships between East Asian sulfur dioxide emissions and Northern Hemisphere sulfate concentrations" by Liu et al.

General comments This paper presents a modeling study by focusing on intercontinental transport of sulfate aerosols from East Asia and its impact on North America. Authors examined the transport sensitivity of sulfate aerosols with varying emissions over East Asia. This research includes interesting and important results which are worthy of publication. The paper is generally well written but can be improved. I recommend that relatively minor but important revisions be made in the paper before acceptance.

Specific comments 1) Page 5541, line 15: The model computes cloud pH interactively

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using mostly inorganic species. How about organic acids in the atmosphere which are important for cloud pH calculation?

2) Page 5541, line 25: The model assumes the wet scavenging of SO₂ with the same rate of H₂O₂ which is too fast I guess. Also is there any consideration of sulfate formation in raindrops? I think that it should be because evaporation of rain drop could be a source of aerosol in the atmosphere.

3) Page 5542, line 5: It would be greatly appreciated if the authors provide a table summarizing SO₂ emissions in each region.

4) Page 5544, line 9: 500mPa should be 500 hPa.

5) Page 5544, line 12: Is there any particular reason for selecting 0.1 ug/m³ value?

6) Page 5544, line 20: The authors argue that the sensitivity of increasing EA emissions is less important than the decrease of SO₂ in terms of transpacific transport of EA sulfate aerosols in surface air over North America because of predominant scavenging of sulfur over the Pacific. However, I guess that it is more related with the subsidence over the Pacific which is a critical factor for contributing EA sulfate aerosol in surface air over North America. This is clearly shown in the figure at 500 hPa.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 5537, 2008.

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