

Interactive
Comment

Interactive comment on “Spatial distribution and seasonal variations of atmospheric sulfur deposition over Northern China” by Y. P. Pan et al.

Anonymous Referee #2

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Interactive comment on “Spatial distribution and seasonal variations of atmospheric sulfur deposition over Northern China” by Y. P. Pan et al.

General comments: The authors present spatial distribution and seasonal variations in dry and wet deposition of sulfur in Northern China, based on both modeling results and measurements at ten sites during a 3-yr observation campaign. Atmospheric deposition of acidic constituents is of great concern in China as its ongoing industrialization might result in substantial release of acidic species to the atmosphere, whereas the situation has not yet been well understood for its most regions. The results are very important for better understanding the magnitudes, pathways, and variations of acid deposition, thus should be worthy of publication in ACP. The major concerns of this reviewer are organization of the manuscript. In addition, the general use of the English

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language also needs to be polished.

Specific comments 1. The title and content of the manuscript do not match with each other. Nitrogen deposition (which has been reported previously by the same authors (Pan et al., ACP, 2012)) and total acid deposition are also included in the paper whereas the title is about sulfur deposition. Please make a proper title, or focus on sulfur deposition and remove contents about nitrogen and total acid deposition. 2. Most materials presented in Section 2 (Materials and methods) are similar to those described in the previous publication by the same authors (Pan et al., ACP, 2012) and should be significantly simplified by referring to that paper. 3. Page 23651: Site descriptions. Please use table to show the GPS, so as to make the text easier to read. 4. Page 23652, line 5 and page 23673, title of Fig. 1: “30min x 30min”, typos? 5. Page 23656 Results: data description. Please use table to show the data directly. 6. Page 23657, line 23: It is better to move “the capital of Hebei province” to the Sect. 2.1 (site descriptions). 7. Page 23660, line 6: Reference (s) is/are needed here to support modeling studies. 8. Page 23659, line 22: In addition to the evidence from emission inventory, the declining trend of SO₂ was identified by satellite measurements over China during 2004-2009 (Zhang et al., 2012). Zhang, X., Van Geffen, J., Liao, H., Zhang, P., and Lou, S.: Spatiotemporal variations of tropospheric SO₂ over China by SCIAMACHY observations during 2004–2009, *Atmos. Environ.*, 60, 238-246, doi:10.1016/j.atmosenv.2012.06.009, 2012. 9. Page 23664, line 17: Reference (s) is/are needed here to support the previous studies. 10. Page 23666 conclusions: remove the first paragraph since it is not conclusion. The content could be integrated in the introduction section (i.e. Section 1). 11. Page 23667, line 27: It is not discussed in the text that “the estimated acid deposition exceeds the critical loads of natural ecosystems”, although S deposition has been framed within the concept of “critical loads” in Page 23665/lines 12-15. Please clarify.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 12, 23645, 2012.

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