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www.atmos-chem-phys-discuss.net/15/C6895/2015/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Delivery of anthropogenic bioavailable iron from mineral dust and combustion aerosols to the ocean" *by* A. Ito and Z. Shi

Anonymous Referee #1

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Referee report (acp-2015-487)

General Comments

Authors successfully quantified anthropogenic soluble Fe due to air pollution under preindustrial and modern conditions by combining laboratory kinetic experiments with global aerosol modeling. Fe dissolution uncertainties associated with organic compounds and proton activity have been investigated. The paper is of novel quality and should be published. There are however a number of issues that need to be addressed before publication. These are highlighted below along with required technical changes.

Specific Comments

1. Introduction: The aim of the study is provided both in the first and last paragraph of this section. Please reorganize, the aim should be mentioned in the same section, preferably in the last paragraph. Moreover, avoid redundancy, lines 122-126 are not required. The titles of each section should be enough for the reader to understand and of course from what it is already mentioned in this paragraph. 2. Laboratory experiments: Details on the Tibesti dust are provided in Shi et al. (2011a; 2015). So I would suggest in order to keep the manuscript short and to the point to start this section with line 139 adding just the information that using the procedure in the above reference little impact has been seen on Fe speciation and dissolution at acidic pH. The last comment is essential, however if the reader needs additional information they can look into the citation. Moreover, the detection limit for the dissolved Fe through the spectrophhotometric method seems to be rather high compared to others in the literature. 4. Development of a new Fe dissolution scheme based on new experimental results: Focus on the new findings of your study i.e. Figure 3 comparison with literature not needed, it is mentioned in the manuscript. Lines 283-291 are results from previous reference. Yet again too much you should be concise as in Section 5.

Technical Corrections

Page 2, line 15-17: I suggest you change the phrase “Here, we, for the first time, interactively combined laboratory kinetic experiments with global aerosol modeling to more accurately quantify anthropogenic soluble Fe due to air pollution.” to “In this study, for the first time, we interactively combined laboratory kinetic experiments with global aerosol modeling to more accurately quantify anthropogenic soluble Fe due to air pollution.”. Page 2, line 17, 19: I would suggest replacing “We firstly examined. . .” with “Firstly, we examined. . .” and “We then. . .” with “Then, we. . .”, respectively for lines 17 and 19. Page 4, line 41-43: Please re-write the sentence i.e. “Thus, improved quantification of atmospheric delivery of bioavailable Fe is essential to estimate more accurately the long-term carbon sink (Jickells et al. 2005).”. Page 13, line 251: I

ACPD
15, C6895–C6897, 2015

believe the author meant “Almost identical slopes were found at . . .”.

Please also note the supplement to this comment:
http://www.atmos-chem-phys-discuss.net/15/C6895/2015/acpd-15-C6895-2015-supplement.pdf

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Interactive comment on Atmos. Chem. Phys. Discuss., 15, 23051, 2015.