

Interactive comment on “Depletion of atmospheric gaseous elemental mercury by plant uptake at Mt. Changbai, Northeast China” by Xuewu Fu et al.

Xuewu Fu et al.

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RC- Reviewer's Comments; AC – Authors' Response Comments

RC: Summary: The study by Fu et al. reports on depletion events of measurements of gaseous elemental mercury (GEM), particulate bound mercury (PBM) and gaseous oxidized mercury (GOM), in a temperate mixed forest at Mt Changbai, Northeast China. Mercury depletion events are a very interesting as well as complicated phenomena and this study help to share light on the mechanism associated with these rapid depletion events occurring in forest in the absence of GOM enrichments. I recommend that this manuscript be published in ACP GMOS Special Issue after the authors address these minor comments.

AC: we would like to acknowledge the anonymous reviewer for dictating the time to

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read our original manuscript and provide valuable suggestions. These suggestions are very helpful and constructive. We have made careful revision in the revised manuscript based on the reviewer's recommendations. The corrections are shown in blue fonts in the revised manuscript.

Specific comments:

RC: P3, L35; There are three operationally defined Hg Forms. The word operationally is so unnecessary in this context please remove.

AC: we deleted the word of 'operationally' in the revised manuscript.

RC: P3, L37; instead of starting the sentence with because rather use Due to its mild reactivity.

AC: 'Because' was changed to 'Due to' in line 37 on page 3 in the revised manuscript.

RC: P3, L39 the reference Gustin and Jaffe, 2010; Holmes et al. A space is needed between the text. This is a problem throughout the whole manuscript. The authors should have a close look of all the references in text and apply correct format. There is either no space between different references or there is no space after a semi colon or comma.

AC: we carefully read the manuscript and added a space between the citations and wording in the revised manuscript.

RC: P3, L42 GEM residence time in atmosphere is 0.5 – 2 years. Please check this statement as most literature state the GEM residence time as 0.5 – 1 year.

AC: we agree with this comment and change the residence of atmospheric GEM to 0.5-1.0 year in line 42 on page 3 in the revised manuscript.

RC: P3, L44 see comments made at L39 AC: a space between the citations and wording in the revised manuscript.

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RC: P3, L57; change small to slow you are referring to cm s^{-1} which is speed AC: the wording has been corrected in line 58 on page 3 in the revised manuscript.

RC: P4, L63 be consistent when writing chemical names or formulas "CO₂, Ozone, sulfur dioxide.." Choose one format and keep with this throughout.

AC: the names of chemical compounds were uniformed in the revised manuscript.

RC: P4, L84; leaf growing season. When is this and how long was the leaf growing season, 1 month, 7 months. Please be specific with this time period.

AC: we defined the period of leaf-growing season in line 86 on page 4 in the revised manuscript.

RC: P5, L108; above ground level should be (a.g.l) please correct this throughout the manuscript. AC: the wording of 'agl' has been corrected throughout the revised manuscript.

RC: I would advise the authors to keep the Supplement information to a minimum. Certain aspect mentioned in the paper can be left out. It's very confusing and time wasting that such a big portion of the text is spent on explaining an aspect but yet the graph containing the information is in the S1 section.

AC: we understand the concern of the length of the supplementary information. Most of the information listed in the supplementary information are valuable for the discussion in the main text. We therefore think the information in the supplement should not be removed. It is not clear to us which aspect motioned in the paper can be left out. The aspect regarding the patterns of depletion events, vertical gradient, foliar flux, and isotopic evidence are important in this paper and should not be left out. The key information with word and data was introduced in the main text. These information together with the supplementary figures are expected to make the discussions more clear.

RC: It would also be useful to mention how long (min, hours or days) a DE occurred. Did the authors investigate this. What was the time criteria for a DE. Also, where there

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any DE outside of May – Sep and if so, how did these DE differ from the May – Sep DE. Where they shorter or longer events. Were there any significant differences in the GEM concentration levels/time if a DE took place outside of the May– Sep window. Was the only criteria for a May – Sep DE that the GEM concentration should be below 0.5 ng/m³. What if the GEM concentration recovered after 10 min was this also classified as a DE. See Brunke et al. and how they classified a DE at Cape Point with time and Hg concentration.

AC: the duration of the depletions were shown in line 219 on page 10 in the revised manuscript. The criteria that define the strong depletions was shown in line 220-221 on page 10 in the revised manuscript. The question regarding the depletions outside the leaf-growing season is interesting. In the revised manuscript, we discussed the depletions outside the leaf-growing season and compared them with these during leaf-growing season. The criteria < 0.5 ng m⁻³ was defined for strong GEM depletions. In general, the duration of strong depletions with GEM concentrations < 0.5 ng m⁻³ lasted for more than 0.5 hour. Å

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-391, 2016.

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