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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Atmospheric mercury in the southern hemisphere tropics: seasonal and diurnal variations and influence of inter-hemispheric transport" *by* Dean Howard et al.

Anonymous Referee #1

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The authors present data of two year mercury and some other ancillary measurements at a site in northern Australia near the ITCZ. They compare their data with other measurements in southern hemisphere and analyse their seasonal and diurnal variations.

As one of the very few long-term measurements in the tropics these measurements are very valuable, as is their analysis. The paper is generally well ordered and written. The subject fits the scope of ACP and the paper should be published. I recommend the publication after consideration of the comments listed below:

Introduction and text: The authors declare night time deposition events as a strong evidence for a "multi-hop" mercury transport model. However, they present no evidence for day time reemissions necessary for being able to talk about "hops". With-

out such reemissions the "multi-hop" transport model remains a lyrics rather than a model. There are other problems with this model: Isn't there a discrepancy between a "multi-hop" model and an atmospheric GEM lifetime of 6 – 12 months mentioned in the "Introduction"? Or between a "multi-hop" model and chapter 3.2.1 on long-range transport?

Section 2.2: Please state the standard conditions (pressure, temperature) at which the Hg concentrations are reported.

Section 3.1: Are the latitudinal differences statistically significant?

Page 2, line 17: "existence"?

Page 4, line 7: Reference "Köppen Aw" is missing in the list of references.

Page8, line 9: Andreae and Merlet (2001) is a review article citing largely work by others. They did not determine the mercury emission factor from biomass burning. Please reword or cite the original work.

Page 8, line 23: a net sink

Page 9, line 23: Year of the reference "Howard et al."?

Page 11, caption of Fig.4: Median values are usually points – please reword. What is IQR?

Page 11, line 5: Mean values should be given with their standard deviations or errors and the number of measurements.

Figure 5: Vertical line at bottom for NH wet season merges with the blue line. Please make it more distinct.

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