**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "Ten years trends in atmospheric mercury concentrations, meteorological effects and climate variables at Zeppelin, Ny-Ålesund" *by* T. Berg et al.

Anonymous Referee #1

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The authors present a detailed analysis of continuous GEM measurements at Zeppelin starting in 2000 and ending in 2009. They do not find any trend in annual median concentrations but they find different trends for different months of the year. They then investigate the influence of meteorological parameters. Their findings are compared with measurements at Alert and Mace Head. Interesting is also the analysis of the GEM dependence on the climatic indicators. The paper is generally well organized and written but at times somewhat vague – see a few comments below. I recommend it publication in the final version.

Specific comments:

Page 2274, line 17: "likely" instead of "likely"

Page 2277, line 12-14: "an extra Teflon filter.." and "due to the presence of two filters..": Where is the second filter, what type? How frequently were they exchanged?

Page 2277, line 16: "Auto calibrations . . .. were verified by manual injections regularly". What does it mean "regularly" – every month, every year?

Page 2278, line 9: ". . . from Fetterer et al. (2012)."

Page 2280, line 20: The authors state "that the quality of the measurements was not as good as for the new automatic data" as a reason for not including the previous measurements in the analysis. Does it mean that the old data are not valid any more? Why do the authors believe that new automatic data are better? Because of their accuracy or precision or coverage? I surmise that the coverage was the problem. Please be specific about the quality problem. I would like to point out that "new automatic data" may be consistently inaccurate for a long period between the calibrations of the internal permeation source despite of their high precision and coverage. Manual measurements may produce less data but not necessarily of lesser quality.

Page 2278, "Statistics", 1st paragraph: Do I understand it properly that 24 * 31 hourly Mann-Kendall tests and Senn's estimators were calculated for e.g. March? If so is the resulting trend an average or median of these estimates?

Page 2282, line 22: ". . .due to less AMDEs" – does it mean less frequent or shallower or both?

Page 2283, line 25: ". . .show an increase in the number of AMDEs" – according to the text before it should read "..an increase in the number of AMDE hours"

Page 2287, last paragraph: Relative humidity is not a good parameter because at a given absolute water content it depends strongly on temperature. The lowest GEM concentrations at 80-90% and the highest at 40-50%, both in April, thus just describe the temperature dependence discussed on page 2285. Absolute water content may be

a more interesting parameter.

Figure 5a, caption: The reader should understand the meaning of the figure without reading the text. What distribution is being shown here? What does % relate to? Perhaps a plot of the number of events would be more informative than that of the relative frequency.

Fig. 6, caption: Opposite to Fig. 5a hours are counted here, not events. "Percentage of AMDE hours..." is thus more precise wording.

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