

Interactive comment on “Dynamic recycling of gaseous elemental mercury in the boundary layer of the Antarctic Plateau” by A. Dommergue et al.

Anonymous Referee #1

Received and published: 12 September 2012

General Comments: This paper presents two weeks of continuous atmospheric Hg⁰ measurements from the Dome-C monitoring site on the high Antarctic plateau. These represent some of the only available continuous measurements of atmospheric Hg in Antarctica to date. This is an important contribution to the peer-reviewed literature given that this is an area of study that needs further attention and exploration. The article is very well written, and despite a relatively small dataset the authors provide a very informed discussion of the possible processes that might be influencing their observations, based upon a thorough review of the existing literature. Some of this discussion is lengthy, and could be tightened so that it is easier for the reader to follow along and separate the findings from the present study from those in the existing literature. After consideration of the few comments provided below, this manuscript is recommended for publication.

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Specific Comments: Abstract: Are the Hg⁰ values reported in the abstract 5-minute values? Or are they average values (e.g. hourly)?

Measurements: p.18136, Line 12: What is meant by the phrase “an atmospherically clean area”? It seems that it is meant to refer to location in which the air is not impacted by any emissions from the station, but the way it is phrased sounds a little odd. It might be enough to just say: “. . . measurements were performed in an upwind area that is 800 m south of the station”. p.18136, Line 22: Is the reported detection limit for the Tekran 2537 based upon the detection limit reported for the Tekran, or was it calculated from the internal calibrations and manual injections? p. 18137, Line 16: Where is the American Tower located relative to the Hg measurement location? p. 18138, Lines 8–10: You might want to remind the reader that you will, in fact, still present the samples collected along the trail between DDU and DC, because at a first read it sounds like all samples from the study were thrown out. Can you present any quantitative information about the field blanks collected along the logistic trail?

Results and Discussion: Figure 2: Are the 5-minute Hg⁰ measurements presented in this figure as hourly averages? Or are they 90-minute averages? You should explain this somewhere in the figure title and/or in the methods section if hourly averages are to be used in the discussion. Also, should there be small gaps in the data every day during the period when the internal permeation source calibration occurred? Figure 3: Why did you use 90-minute bins instead of hourly bins? Sections 3.2 – 3.4: These discussions on how meteorological conditions and atmospheric chemistry in the Antarctic atmosphere might be influencing the observed Hg⁰ concentrations are interesting and important, and the authors have clearly performed a thorough review of the existing relevant literature. However, the discussion as it is currently presented is very lengthy and at times it is difficult to distinguish between what is being obtained from measurements in this study and what is conjecture from the existing literature. As a reader, it is easy to get lost in the discussion and the references and lose sight of the important findings or hypotheses. One way to address this could be to have separate Results

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and Discussion sections, and then try to tighten up some of the Discussion so that it is easier for the reader to follow along and understand the key points that the authors wish to make.

Technical corrections: Figure 1 should say “locations” instead of “localization”. p. 18145, line 7: The word “univoqually” should perhaps be “unequivocally”.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 18133, 2012.

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