Atmos. Chem. Phys. Discuss., 14, C10131–C10132, 2014
www.atmos-chem-phys-discuss.net/14/C10131/2014/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Comparison of mercury concentrations measured at several sites in the Southern Hemisphere" *by* F. Slemr et al.

Anonymous Referee #2

Received and published: 14 December 2014

Atmospheric Hg studies in the Southern Hemisphere are very limited. This paper presents a comprehensive measurement of atmospheric GEM concentrations at five remote sites in the Southern Hemisphere. The multiple monitoring sites and long-term (1-7 years) continuous measurements are capable of depicting the overall distributions of atmospheric GEM in the Southern Hemisphere. The authors studied the temporal and spatial distribution pattern of GEM at the monitoring station. Results reveal that the atmospheric GEM concentrations were much more uniformly distributed throughout the Southern Hemisphere than that suggested by previous studies. A novel finding from this paper is that atmospheric GEM at Cape Point showed a increasing trend for the period of 2007-2013. This is different from previous observations at the same station and corresponding well with the increasing anthropogenic Hg emissions in the world. This

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Interactive Discussion
Discussion Paper

paper provides several important information that complement the current knowledge gaps in global atmospheric Hg studies. The sampling technique is sound, datasets and uncertainties were scientifically evaluated. I suggest that this paper should be published in ACP in a final version. I have no major questions on the manuscript. There are several minor points should be addressed before final publication.

1. In the abstract, the authors declaimed that one or few sites in the Southern Hemisphere could be reprehensive for the whole hemisphere. I think this may be not correct for some of the cases. As I seen, the monitoring stations were mainly located in isolated inland and coastal areas. They may not represent the levels of atmospheric GEM in continental sites such as in South Africa and South America, where have some anthropogenic sources.

2. I saw there are differences in atmospheric GEM concentrations at the five stations. For example, the median GEM concentration at Troll in the Antarctica were abut 0.2 ng m-3 lower than that at Cape Grim on the north-west coast of Tasmania, Australia. The former were mostly isolated from anthropogenic sources while the later might be influenced by some emission from Austria. Although this spatial pattern will be not significant as the sampling uncertainties were taken into account. I think the authors should interpret a little bit for the spatial patterns.

3. The authors suggested that there is an increasing trend in atmospheric GEM since 2007. As seen from Figure 4, however, this may not be true for 2007-2011. I think the significant correlation may be partially due to the increasing number of datasets (monthly medians).

4. Atmospheric Hg observations in the Northern Hemisphere should be used to compare with the study. Such a comparison may make the readers know better the global distributions of atmospheric Hg as well impacts of anthropogenic sources on atmospheric Hg distributions.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 30611, 2014.

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14, C10131–C10132, 2014