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Interactive comment on “Total gaseous mercury depletion events observed at Cape Point during 2007–2008” by E.-G. Brunke et al.

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Brunke et al. present some topical and interesting research results on atmospheric mercury. The authors observed depletion of total gaseous mercury (TGM) in the marine boundary layer on several occasions during the years 2007 and 2008. By discussing the relation of TGM to different atmospheric variables and meteorological regimes Brunke et al. made an effort to explain these depletion events. However, they come to the conclusion that the chemical mechanisms controlling TGM depletion remain unresolved.

In their study Brunke et al. used a Tekran 2537A mercury vapour analyzer with TGM accumulation intervals of 15 minutes and internal calibrations every 25 hours. However, the authors do not refer to any additional quality control measure, which they might

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have performed (e.g. standard additions with an external reference gas). It is known that volatile organic compounds can de-activate the surface of the gold cartridges of the Tekran instrument, especially if accumulation intervals longer than 5 minutes (recommended by the manufacturer) are applied. This de-activation, which can reduce cartridge efficiency by more than 50%, may be temporary and the gold cartridges, which can regain full efficiency after repeated heating cycles in clean air.

Brunke et al. could relate the observed depletion events to reduced wind velocities. This may go along with a different mercury source area and possibly elevated concentrations of volatile organic compounds. As cartridge de-activation can occur very rapidly – one accumulation interval could suffice – the observed TGM depletion might be explained by the different source area; and as soon as the wind shifts again to where elevated VOC concentrations are absent, the gold cartridge efficiency could be restored again within a few hours due to repeated heating cycles in “clean air”.

In their search to find an explanation for the observed depletion events, the authors may take any instrumental artefacts into consideration. Partial de-activation of the gold cartridges is a conceivable factor and could be addressed – and maybe refuted – by adding standards to the air samples during depletion events.

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