

# Commentary

## Perspectives on South African atmospheric mercury scientific research

**Patricia Forbes**

Department of Chemistry, University of Pretoria, Pretoria

On the 30 September 2015, a workshop entitled “International and National Landscape of Atmospheric Mercury” was held in Bloemfontein prior to the start of the annual National Association for Clean Air (NACA) Conference. Dr Ian Hedgecock of the CNR-Institute of Atmospheric Pollution Research in Italy provided a global context to atmospheric mercury levels, impacts and policy and highlighted challenges faced (see his commentary for more information), whilst Dr Vincent Gololo of the Department of Environmental Affairs provided a summary of the status of the development of the South African mercury emissions inventory.

Several researchers from the South African air quality community then presented work their work in the field of atmospheric mercury, which is briefly summarised here. Dr Pieter van Zyl of the Unit of Environmental Sciences and Management at the North-West University discussed the statistical analysis of the gaseous elemental mercury (GEM) monitoring data from the Global Atmospheric Watch (GAW) station at Cape Point, from which predictive/estimation equations were developed. Shipping trade routes were identified as a potential source of atmospheric Hg and a decline in GEM at the site over the period evaluated was noted (Venter et al., 2015).

Dr Patricia Forbes gave an overview of analytical chemistry research in atmospheric mercury monitoring, which had largely been undertaken at the Council for Scientific and Industrial Research (CSIR). The use of cost-effective, portable, alternative Hg monitoring methods were discussed; namely sorbent tube sampling and biomonitoring (using lichens as passive samplers) were compared to a semi-continuous mercury analyser (Trüe et al., 2010 and 2012). These alternative methods can be used to identify “hotspots” to guide the placement of more comprehensive, expensive monitoring equipment.

Dr Lynwill Martin of the South African Weather Service provided detail regarding the 19 years of monitoring of gaseous elemental mercury at the Cape Point GAW station. The first paper on the results obtained was published in 2002 (Baker et al., 2002), which noted a 12 month lag period between Hg levels in the Northern and Southern Hemispheres. Following from the installation of a Tekran instrument in 2007, unique mercury depletion events were noted at the site, where Hg levels decrease to less than 75% of normal background levels and which last for longer than 4 hours and are not accompanied by a decrease in ozone (Brunke et al., 2010). This phenomenon has generated a significant amount of interest from the international scientific community. Positive correlations have also been found between mercury concentrations in the

atmosphere (GEM) and rainwater (total mercury) at Cape Point over a seven year period (2007-2013) (Brunke et al., 2015) (see the Research Brief by Brunke et al. for more details).

Prof Hannes Rautenbach of the Laboratory for Atmospheric Studies at the University of Pretoria gave an overview of the atmospheric mercury dispersion and deposition distribution modelling that is being undertaken using the Weather Research and Forecasting (WRF) model and fine resolution (3 km).

Future collaborations and projects planned were also mentioned by presenters, which indicates that interest in this field is continuing, and that further contributions to the science of atmospheric mercury are expected to be made by South African air quality researchers in the future.

### References

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