



Traceability of greenhouse gases and volatile organic compounds for air monitoring in South Africa

James Tshilongo (1), Napo Ntsasa (1), Silindile Lushozi (1,2), Mudalo Jozela (1,2), Goitsewang Lekoto (1,2), and Luke Chimuka (2)

(1) National Metrology Institute of South Africa, Gas Analysis, Pretoria, South Africa (jtshilongo@nmisa.org), (2) University of Witwatersrand, Department of Chemistry, PO. Bag 3, Braamfontein, Johannesburg, 2050, South Africa

The measurements of air pollutants have increasingly become very important over the last twenty years. The sources of air pollutants into the atmosphere have been studied in previous years, however the emphasis has been to generate information on the analysis of samples from background conditions (clean air). Pollutants of interest such as the greenhouse gases and the volatile organic compounds are among the most studied owing to their contribution to global warming.

The analysis of component gases mentioned requires reference standards which are traceable, to be able to compare data globally. This is achieved by sampling at global atmospheric watch stations and ambient network stations, followed by analysis in the laboratories using reference gas mixture of high metrological capability. The preparation of such reference standards is challenging due to the nature of the components and the vessels in which they are contained.

The paper will present the results of selected greenhouse gases and volatile organic compounds in South Africa studied by the National Metrology Institute of South Africa. The results include the preparation of reference standards and analysis of samples from Cape Point Global Atmospheric Watch station in Cape Town. The presented results include the analysis by chromatographic and spectroscopic methods. Expanded uncertainties, $k=2$, of 0.04% relative to the gravimetric mole fraction were obtained.

Keywords: Greenhouse gas emissions, Primary reference gas mixtures, GC-FID, CRDS, atmospheric air