World Calibration Centre for Aerosol Physics

Audit Report

Global Atmospheric Watch Station „Cape Point“, South-Africa

Auditor: Prof. Dr. Alfred Wiedensohler

Date: Dec. 12, 2014

This audit was a re-audit of the audit performed in May 2006.

General

I found the station in very good condition. As reported already in 2006, aerosol measurements have performed since November 2005.

- Particle Soot Absorption Photometer (PSAP) (3 wavelength absorption coefficient)
- TSI Integrating Nephelometer model 356300 (3 wavelength scattering and backscattering coefficient)

Since then following instruments have been added.

- A PFR sun-photometers to determine the Aerosol Optical Depth (AOD) in cooperation with the World Optical Depth Research and Calibration Center in Davos, Switzerland (as recommended in the previous audit report). - Available since 2008
- A Continuous Light Absorption Photometer (CLAP) to determine the 3 wavelength absorption coefficient in cooperation with NOAA. - Available since 2013
- A Mobility Particle Size Spectrometer to determine the submicrometer particle number size distribution in cooperation with the North-West University (Potchefstroom), the Finnish Meteorological Institute (Helsinki, Finland), and the Leibniz Institute for Tropospheric Research (Leipzig, Germany) - Available since 2014

Manuals for the instruments and written logbooks have been available at the station.

Inlet

The aerosol inlet is a NOAA-type high flow turbulent inlet as described in the previous report, mainly built for the particle light scattering and absorption measurements.

We recommend, however, installing a separate low flow laminar inlet for the particle number size distribution measurement. The reason is that particle losses due to diffusion are a) minimized and can be b) better corrected.

Absorption Photometers

The PSAP is still in operation as described in the previous audit report

The CLAP is a NOAA/GMD developed, filter-based method that measures light absorption by particles at three wavelengths (467, 528, 652 nm). The CLAP is similar to the PSAP in that particles are collected on a filter and light transmission through the filter is monitored continuously. The CLAP differs from the PSAP in that instead of a single sample spot, it has 8 sample spots. Solenoid valves are used to switch to the next sample spot once the transmittance reaches 0.7.

Last flow checks have been made on Dec 10, 2015.

Zero checks are performed with a HEPA filter every 3 months. No Zero check was done during the audit.

Integrating Nephelometer

The TSI Integrating Nephelometer is still in operation as described in the previous audit report

Zero Check is done every day, and the span checks with CO2 every week.

The last span check was done on Dec. 8, 2014.

Mobility Particle Size Spectrometer

The Mobility Particle Size Spectrometer is a TROPOS-type SMPS (Scanning Mobility Particle Sizer) as described in Wiedensohler et al. (2012).

Bipolar charger is a TSI-type 3077A with 370 MBq.

CPC Zero check and latex particle calibration Dec 11, 2014

SMPS in operation.

Summary

The general impression and the performance of the aerosol measurements at the Cape Point Observatory are excellent.

I thank the staff of the Cape Point Observatory (Casper Labuschagne and Nkanyiso Mbatha) for their hospitality and cooperation.