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A diluter for a PSAP at a EUCAARI-station in South Africa

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One of the four EUCAARI (Kulmala et al., 2008) stations outside Europe is located in Elandsfontein, South Africa (Elandsfontein). An overview of these measurements is given by Laakso et al. (this issue). At the station light absorption by particles is measured with a Multi-Angle Absorption Photometer (MAAP) (Petzold and Schönlinner 2004). The MAAP measures light absorption at one wavelength only. ,Therefore, a 3-wavelength Particle Soot Absorption Photometer (3wl PSAP) (Virkkula et al. 2005) was also added to the setup in order to get information on the wavelength dependency of the light absorption, and also to provide wavelength dependent absorption data for comparisons for the scattering data provided by the 3-wavelenght nephelometer.

The PSAP is a filter-based method with a manual filter change. This creates problems at a station visited only weekly or even every 2 weeks. In order to prolong the filter changing period, the sample flow is diluted (Figure 1) approximately at the ratio of 1:10. The dilution is analogous to the closed-loop arrangement generally used in a DMPS or SMPS. Dilution is arranged by mixing the sample air flow with clean, filtered air. The flow makes a loop from a Thomas membrane pump through a flow fluctuation dampening chamber to an absolute filter, from where it goes to a mixing tube and back to the pump. The dilution flow is monitored by a differential pressure measurement (dP sensor). If there are no leaks in the system, the loop is closed and the flow to the PSAP (QPSAP) equals the sample flow (Q_S) from the inlet to the diluter tube.

The experiences gained from the first 6 months of the dilution system will be presented.

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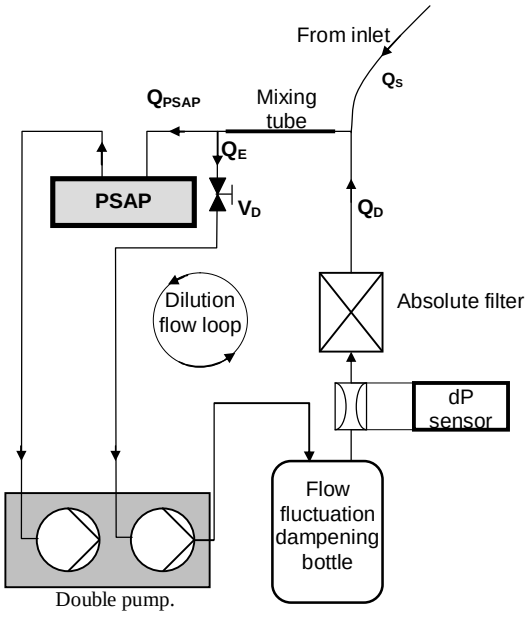

Figure 1. Flows of the PSAP dilution system at Elandsfontein, RSA.