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Novel Multi Wavelength PhotoAcoustic System (WaSul-MuWaPas) for spectral characterisation of aerosols.

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Spectral aerosol light absorption is one of the most important parameter for the assessment of the radiation budget of the atmosphere. Despite of its importance, determining the direct radiative forcing by aerosols is limited by the strong uncertainties of available on-line instruments for aerosol light absorption measurements, e.g. the Aetholometer and the Particle Soot Absorption Photometer. These instruments are limited in accuracy and time resolution because they are based on the measurement of light attenuation by the aerosol deposited on a filter substrate. In this paper we present a novel instrument for direct light absorption measurements in the atmosphere.

We have developed a novel Multi Wavelength PhotoAcoustic System (WaSul-MuWaPas) based on the diode laser pumped, high repetition rate, Q-switched Nd:YAG laser and its frequency converted harmonics for direct determination of light absorption by aerosols.

This instrument has designed to make *in situ* measurements at four different wavelengths simultaneously from the NIR to the UV wavelength range (1064nm, 532nm, 355nm, 266nm). The MuWaPas system is free from the entire problem related to the multi-scattering effects in the above filter methods since it measures directly the opti-

cal absorption coefficient on airborne particles. Thanks for the wide wavelength range and the direct measurement method the MuWaPas system is a very promising candidate for aerosol absorption measurements of various atmospheric aerosols such as black carbon, mineral dust, and secondary organic and inorganic aerosols. as well as for source apportionment studies. The measurement method is absolute due to the determination of each cell constant by means of calibration measurements using well known concentrations of NO_2 molecules with has a defined optical absorption cross section at 532nm.

In this work we will demonstrate the determination of the cell constants. We also present first results of aerosol absorption measurements using different types of laboratory generated soot aerosols (spark generator soot, propane flame soot) that have a well known wavelength dependency.

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