



Time series of measurements of light absorbing aerosol particles at the Sonnblick Observatory

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The determination of the light absorbing components black carbon (BC) and brown carbon (BrC) as well as of mineral dust at high alpine sites is of special interest. BC was shown to be the second most important anthropogenic climate-forcing agent after CO₂ due to its strong light absorption per unit mass. BrC derives its name from enhanced light absorption at shorter wavelengths due to organic chromophores and was found to be ubiquitous. Biomass burning was identified as the major emission source for BrC, by direct emissions or via secondary formation. Mineral dust, often originating from long-range transport of desert dust, was found to effect large regions of the globe on a regular base.

On-line characterization of aerosol particles with an aethalometer allows the quantification of BC and the differentiation between the contribution related to fossil fuels and biomass burning, based on an evaluation of the wavelength dependence of the absorption coefficients. The determination of this Angstrom exponent can also be utilized, especially if combined with measurements of the scattering coefficients at different wavelength, to characterize the occurrence of mineral dust. On-line aerosol monitoring was performed for a one year period at the remote and high elevation site Sonnblick Observatory (3106 m a.s.l, main alpine ridge, Austria). Additionally filter sampling (quartz fiber filters, weekly sample change) and subsequent analysis of these samples for carbon parameters (organic carbon and elemental carbon), inorganic ions as well as for anhydrosugars (mainly levoglucosan) was performed. Thus the possible occurrence of wood smoke and also mineral dust can be further elucidated. Results of particulate matter characterization determined during this period are presented and discussed as necessary input parameter to assess the influence of these light absorbing particles to optical properties of aerosol particles above the alpine region.