

EGU21-13398

<https://doi.org/10.5194/egusphere-egu21-13398>

EGU General Assembly 2021

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Should black carbon concentration from aethalometer measurements onboard of UAVs be additionally corrected? - What is the impact of rapid relative humidity changes on our measurements?

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Relative humidity and rates of its change are relevant parameters in atmospheric sciences. Observations of output data of AE-51 aethalometer operating in ACS1000 humidity chamber reveal strong dependence of attenuation on rapid relative humidity changes. Data collected in winter 2020/21 suggests a probability of similar effect occurring during UAV measurements as thermodynamic parameters could change fast during such runs. Two AE-51 devices were connected in the WET and DRY ACS1000 humidity chamber's channels. During periodic relative humidity oscillations, incident negative peaks of equivalent black carbon mass concentration coincide with high negative derivatives of relative humidity. In most extreme cases values of -1000 ng/m³ equivalent black carbon mass concentration were recorded in parallel with relative humidity derivative of -1.5 %/min. These correlations seem to play an important role in atmospheric measurements as vertical profiles of aerosol parameters such as attenuation are collected using UAV runs during which relative humidity varies significantly. Our goal is to propose a correction method to minimise these anomalies.