



Performance of Airyx SkySpec MAX-DOAS systems during different field campaigns

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MAX-DOAS systems (so called Airyx SkySpec instruments) were developed and are available from Airyx GmbH. These are based on the former Envimes MAX-DOAS systems.

The instruments are based on compact Avantes spectrometers and were used during different field campaigns from 2013 onwards, as e.g. during MADCAT, AROMAPEX, CINDI-2, a year-long campaign at PPAO(England) and various others. We present exemplary the performance of these instruments under field campaign conditions.

The SkySpec instruments are available in three versions: the compact 1D type for mobile applications using only one spectrometer typically from 300-460nm and the stationary type using two spectrometers each to cover a larger spectral range, which is available with a 1D or 2D telescope unit. We list their respective properties.

The 1D telescopes allow for automatic acquisition of calibration spectra and the elevation angle is determined by an inclination sensor which simplifies the setup of the instrument and reduces potential user errors. We show examples for the spectral stability of the instruments, the accuracy of the elevation calibration and example data sets for trace gas observations.

The 2D instruments are based on the 1D telescope version and have been extended to allow for direct sun measurements. As the optical setup is such that spectra from direct sun observations and from scattered light can be evaluated against each other without significant residual structures in the data evaluation, this allows to retrieve absolute SCDs for various trace gases. We show example fits and SCD time series.

The well-defined light path of direct sun measurements can be used as an additional constraint in profile inversions, but can also be directly used for the calculation of VCDs using the Langley plot method for HCHO, H₂O, O₄ and others.