



New design of Long-Path-Telescopes for atmospheric trace gas measurements based on fibre optic

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Long-Path-telescopes are commonly used for atmospheric trace gas measurement, especially in combination with the DOAS (Differential Optical Absorption Spectroscopy) analysis technique. Such an instrument combines the emitting and receiving telescope in one device with a double-Newton-style set-up and a Xe-high pressure lamp as light source and has a typical size from 1..2m. Therefore this instrument requires a high effort in planning and executing of field measurements and it has also a limited signal-to-noise ratio. We developed a new design based on fibre optics, which is easier to handle, more stable in the alignment and also more efficient in the transmission and receiving of light. The use of a fibre coupled light source improves the spectral characteristics especially for light sources with a spatial variation of spectral features like high-pressure arc lamps and LEDs. This new set-up was tested successfully in field measurements. The construction of smaller generation of Long-Path-telescopes is now possible, which would extend the range of the application for this instrument. Together with new economic light source like the LED, this instrument can be used for automatic monitoring of air pollutions.