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Satellite remote sensing of vegetation

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DOAS (Differential Optical Absorption Spectroscopy) allows to determine the concentration of trace gases based on their specific absorptions cross-sections along a light path. Since 1995, this principle is employed successfully on satellite-based instruments like GOME, GOME-2 and SCIAMACHY for the global measurement of stratospheric and tropospheric trace gases like ozone and nitrogen oxides. Usually, spectral signatures from the ground, where a big part of the sunlight is reflected, are neglected in the evaluation. This can lead to errors in the trace gas determination. However, these structures offer the opportunity to identify surface properties of the earth and different types of vegetation.

To analyse spectral reflectance properties, high resolved reflection spectra (FWHM 0.29 nm) from 95 plants were measured between 350 and 1050 nm. They can serve as a basis for the analysis of satellite data. Including different vegetation reference spectra, it is possible to determine groups of plants with similar optical properties. This allows to derive global maps of the spatio-temporal variation of plant distribution by satellite remote sensing. We present first results of this technique based on SCIAMACHY observations.