



Direct observation of two dimensional Trace Gas Distributions with an airborne Imaging DOAS Instrument

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Information about trace gas distribution is highly desired, not only by chemical transport models. Therefore a novel airborne imaging differential optical absorption spectroscopy (IDOAS) was invented to observe the distribution of several trace gas i.e. NO₂, SO₂, HCHO, CHOCHO, H₂O and O₄.

The IDOAS spectrometer measures scattered and reflected sunlight in the ultraviolet and visible wavelengths, along a line perpendicular to the aircraft track. Combined with the aircraft's forward motion this produces a two-dimensional image. The high spatial resolution of the instrument allows a map of vertical column concentration to be made, which has applications for enforcement of air-quality legislation and investigation of plume chemistry and dispersion.

First tests of novel aircraft instrument in the Highveld (South Africa) showed strong variations of NO₂ column densities in the immediate vicinity of various sources. A measurement campaign in the same area is in progress, in order to validate the satellite retrievals on a regional scale and investigate individual sources on a local scale.