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Light path enhancement inside a tropical cloud estimated form airborne O_4 DOAS measurements

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The Airborne Multi AXis DOAS instrument observes stratospheric and tropospheric air masses. In September 2002 a special measurement campaign for the validation of SCIAMACHY on ENVISAT was performed reaching from Greenland to the Seychelles. Over the tropics a large cloud was crossed by the aeroplane. Enhanced column densities of many trace gases like NO_2, O_3 as well as O_4 and H_2O were registered by all active lines of sight. Inside large clouds the light path is often enhanced due to multiple scattering. The O_4 Slant Column Density is a well established indicator to estimate the light path from ground based DOAS measurements.

Here we present a method to estimate the light path enhancement based on the O_4 SCDs observed by the different lines of sight of the AMAXDOAS instrument. Inside the cloud a path length of approximately 170 km was deduced and an average NO_2 mixing ration of 0.5 ppb can be calculated. Compared to the typical background concentration the observed value is enhanced most probable due to lightning.