Improvement of the Fresco cloud algorithm for Sciamachy

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As radiative scattering by clouds strongly influences retrievals of tropospheric gases and aerosols from satellite spectrometers (GOME, SCIAMACHY or GOME-2), accurate co-located cloud information is required. The O_2 A-band at 760 nm is the strongest band of O_2 in the Visible Near-Infrared and thus, is well suited to provide cloud information. Since oxygen is a well-mixed gas, the measured column amount of oxygen yields the cloud top pressure.

The FRESCO (Fast Retrieval Scheme for Clouds from the Oxygen A-band) method is a fast and robust algorithm providing cloud information from the O_2 A-band for cloud correction of ozone. Global cloud data from SCIAMACHY are analysed through the comparison with the operational cloud product from OCRA. Both approaches retrieve similar cloud information although FRESCO overestimates cloud fraction over deserts. To improve FRESCO retrievals, its surface albedo database is decontaminated from the presence of desert dust aerosols using the GOME Absorbing Aerosol Index. From comparison with cloud information from the instrument MODIS, as well as from the PMD cloud algorithm OCRA, it is shown that this approach succeeds well in improving FRESCO retrievals over deserts for SCIAMACHY.