



The Ring effect in ozone vertical column retrieval from satellite measurements

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We compare different methods to treat rotational Raman scattering (RRS) effects in the retrieval of vertical ozone columns from satellite measurements. The filling-in of solar Fraunhofer lines and telluric features by rotational Raman scattering (known as the Ring effect) needs to be taken into account when retrieving trace gas concentrations from ultra-violet and visual satellite observations. Since rotational Raman scattering is inelastic, a full (on-line) radiative transfer calculation of its effect within the retrieval process is generally not feasible and approximations have to be used. We compare the results of ozone column retrievals based on full on-line RRS calculations with those obtained from using (a) look-up tables of RRS corrections generated off-line, and (b) the scaling of an empirically-derived Ring effect source spectrum. It is found that, although direct calculations provide the most accurate treatment of the Ring effect, a fast-to-calculate and almost equally accurate result can be obtained by the combined use of look-up tables and an empirically generated Ring source spectrum.