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1 Determination of COF_2 vertical distributions above Jungfraujoch by FTIR and multi-spectra fitting

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The major sources of fluorine in the stratosphere are CFC-11 and CFC-12. Photolysis of these compounds leads to release of chlorine atoms, while the fluorine is, in a first step, present in the form of carbonyl compounds like COClF and COF_2. Their further photolysis liberates fluorine atoms, which are quickly converted to HF. Given its long life time, COF_2 is the second stratospheric fluorine reservoir.

The first COF_2 vertical distributions were derived from occultation measurements performed by the ATMOS instrument during the SPACELAB-3 Space Shuttle mission in 1985. The Canadian FTIR spectrometer ACE-FTS, onboard the SCISAT-1 satellite, is the first instrument since the last ATMOS flight in 1994, to record COF_2 vertical profiles from space. All these observations show that, at mean latitudes, COF_2 concentration is maximum between 30 and 35 km.

Several COF_2 IR absorption lines located either in the so-called InSb (1-5 μm) and MCT (2-16 μm) spectral ranges can be used to determine its total column from ground-based FTIR observations. In this context, several studies concerning the evolution of COF_2 total column above various stations were published during the nineties.

At this time, no study concerning the inversion of COF_2 vertical distributions from

ground-based FTIR spectra has been published. This report deals with the feasibility of such inversions, using, simultaneously, via the SFIT-2 v3.91 algorithm, a multi-microwindows and a multi-spectra fitting procedure. The multi-spectra method consists of combining several FTIR observations, recorded during the same day, to increase the information content. A selection of microwindows in InSb and MCT ranges, a complete discussion about the data characterization (e.g. information content) and typical examples of COF_2 retrieved profiles from high resolution solar spectra recorded with the University of Liège Jungfraujoch FTS will be revealed.