

## Current Trend in Carbon Tetrachloride from several NDACC FTIR stations

James Hannigan<sup>a</sup>, Mathias Palm<sup>b</sup>, Stephanie Conway<sup>c</sup>, Emmanuel Mahieu<sup>d</sup>, Dan Smale<sup>e</sup>, Eric Nussbaumer<sup>a</sup>, Kim Strong<sup>c</sup>, Justus Notholt<sup>b</sup>

- a. National Center for Atmospheric Research, Boulder, CO, USA
- b. University of Bremen, Bremen, Germany
- c. University of Toronto, Toronto, Canada
- d. University of Liege, Liege, Belgium
- e. National Institute of Water and Atmospheric Research, Lauder, New Zealand

To obtain a global perspective on total column trends of Carbon Tetrachloride ( $\text{CCl}_4$ ) we use measurements from several stations of the ground based NDACC (Network for the Detection for Atmospheric Composition Change, [www.ndacc.org](http://www.ndacc.org)) from the Arctic to mid-latitudes. Data from Eureka (80°N), Ny Alesund (79°N), Thule (76°N), Jungfraujoch (47°N) Mauna Loa (20°N) and Lauder (45°S) are included. Retrievals for these stations were performed in a homogeneous manner in the 12 $\mu$  spectral region of the solar absorption spectra routinely recorded at 0.0035 $\text{cm}^{-1}$  resolution. The retrieval follows the methods described in Rinsland [Rinsland et al, 2012] with some updates where specific accounting of the  $\text{CO}_2$  linemixing must be applied in the forward model to achieve fitted residuals appropriate to the SNR & quality of the spectra.

The datasets for each site varies but are all analyzed through 2014. The data used in the trends are daily averages from inhomogeneous sampling due to observing limitations of a required clear sky and which, in the Arctic is further limited by the polar night. A bootstrap resampling technique is used to statistically mitigate the sampling [Gardiner et al, 2008]. We will discuss the altitude sensitivity of the retrievals, the annual cycle and long term, approximately 15 year trend in the data by latitude.

Rinsland, C. P., et al.: *Decrease of the carbon tetrachloride ( $\text{CCl}_4$ ) loading above Jungfraujoch, based on high resolution infrared solar spectra recorded between 1999 and 2011*, Journal of Quantitative Spectroscopy and Radiative Transfer, 2012, 113(11), 1322–1329, doi:10.1016/j.jqsrt.2012.02.016

Gardiner, T., et al.: *Trend analysis of greenhouse gases over Europe measured by a network of ground-based remote FTIR instruments*, J. Atmospheric Chemistry and Physics, 2008, 8, 22, 6719–6727, doi:10.5194/acp-8-6719-2008