

TCCON Updates and Improvements to Precision Requirements

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The Total Carbon Column Observing Network (TCCON), which is currently made up of 26 sites, internationally, is a well-established network of ground-based Fourier Transform Spectrometers that record direct solar spectra in the near-infrared. Accurate and precise column-averaged abundances of carbon dioxide (CO₂) (as well as of other atmospheric constituents - methane [CH₄], nitrous oxide [N₂O], hydrogen fluoride [HF], carbon monoxide [CO], water [H₂O], and semi-heavy water [HDO]) are retrieved from these spectra. Dating back to 2004, TCCON data have already proven to be valuable in providing ground truth for satellite measurements of CO₂ and CH₄ column abundances and in evaluating large-scale carbon models and improving global estimates of the sources and sinks of CO₂ and CH₄. In this work, we will briefly describe developments to the TCCON network over the past year, including the most up to date CO₂ and CH₄ time series, the introduction of new network sites, and the extended measurement capabilities into the mid-IR at several sites. In addition, we will highlight ongoing efforts to reduce errors / improve precision of the TCCON results through a number of changes to the GGG retrieval software.



Figure 1. Since the installation of the first station in Park Falls, WI in May, 2004, the Total Carbon Column Observing Network (TCCON) has grown to over 26 sites worldwide with 4 future sites in the planning.