GROUND-BASED SOLAR ABSORPTION STUDIES FOR THE CARBON CYCLE SCIENCE BY FOURIER TRANSFORM SPECTROSCOPY (CC-FTS) MISSION

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Carbon Cycle science by Fourier Transform Spectroscopy (CC-FTS) is an advanced study for a future satellite mission. The goal of this mission is to obtain a better understanding of the carbon cycle in the Earth's atmosphere by monitoring total columns of the gases CO_2, CH_4, N_2O, CO and O_2. A Fourier transform spectrometer (maximum spectral resolution of 0.1 cm^{-1}, maximum optical path difference 5 cm) operating between 2000 and 15000 $cm^{-1}$is proposed as the primary instrument for the mission. As part of this advanced study, high resolution solar absorption spectra were recorded over a range of solar zenith angles using Fourier Transform spectrometers at Kitt Peak, Arizona and Waterloo, Ontario. Atmospheric column densities of CO_2, CH_4, N_2O, CO and O_2 were retrieved from these ground-based observations. The HITRAN 2004 spectroscopic parameters were used with the SFIT2 package for the spectral analysis. The measurements are used to evaluate the spectral regions for the CC-FTS retrievals for these species. In future, these measurements will be used to evaluate potential optical components and retrieval parameters for use in the CC-FTS project.