

## Early Comparison of OCO-3 XCO<sub>2</sub> Measurements with TCCON

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The Orbiting Carbon Observatory-3 (OCO-3) was successfully launched on May 4, 2019 from Kennedy Space Center via a Space-X Falcon 9. One week later, the instrument was installed as an external payload on the International Space Station (ISS). OCO-3 extends NASA's study of carbon and measures the dry-air mole fraction of column carbon dioxide (XCO<sub>2</sub>) in the Earth's atmosphere from space. These space-based measurements are compared to ground-based observations from the Total Carbon Column Observing Network (TCCON). TCCON is a global network of high-resolution ground-based Fourier Transform Spectrometers that records spectra of the sun in the near-infrared spectral region. From these spectra, accurate and precise column-averaged abundances of atmospheric constituents including CO<sub>2</sub> are retrieved. TCCON data are tied to the WMO scale and serve as the link between calibrated surface in situ measurements and OCO-3 measurements. OCO-3's agile 2-D pointing mirror assembly (PMA) allows the instrument to stare at a TCCON station as it passes overhead - providing information about the quality, biases, and errors in the OCO-3 data. Here, we show early comparisons between the OCO-3 XCO<sub>2</sub> dataset collected during target mode observations and coincident TCCON measurements. Finally, we discuss site-dependent biases and its potential origins.

Keywords: CO<sub>2</sub>, International Space Station, Greenhouse Gas