Early Results from the First Year of Operations of the OCO-2 Mission

David Crisp[1] *[david.crisp@jpl.nasa.gov] for the OCO-2 Science Team*

[1] *Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA*

The NASA Orbiting Carbon Observatory-2 (OCO-2) was successfully launched on 2 July 2014 and joined the 705 km Afternoon Constellation (A-Train) on August 3, 2014. Its 3-channel imaging grating spectrometer was then cooled to its operating temperatures and a series of calibration and validation activities was initiated. Since early September of 2014, this instrument has been returning almost one million soundings each day over the sunlit hemisphere. As expected, about 13% of all soundings are sufficiently cloud free to yield full-column estimates of the column-averaged CO_2 dry air mole fraction, X_{CO2}, with single-sounding random errors are between 0.5 and 1 ppm at solar zenith angles as large as 70 degrees. With almost a year of data in hand, global X_{CO2} maps are starting to reveal some of the best known features of the atmospheric carbon cycle. X_{CO2} enhancements co-located with fossil fuel emissions in eastern U.S. and eastern China are most obvious in the fall, when the north-south X_{CO2} gradient is small. Enhanced X_{CO2} associated with biomass burning in the Amazon, central Africa, and Indonesian is also obvious in this season. From late May to mid-July, OCO-2 maps show a 2-3% reduction in X_{CO2} across the northern hemisphere, as the land biosphere rapidly absorbs CO_2. As the carbon cycle community continues to analyze these OCO-2 data, quantitative estimates of regional-scale emission sources and natural sinks are expected to emerge. This presentation will summarize the OCO-2 mission status, early products, and near-term plans.