6.069 Measuring Atmospheric CO2 with the NASA Orbiting Carbon Observatory-2 (OCO-2).

Presenting Author:
 David Crisp, JPL/Caltech, David.Crisp@jpl.nasa.gov

Abstract:

Fossil fuel combustion, deforestation, and other human activities are adding almost 40 billion tons of carbon dioxide (CO_2) to the atmosphere each year. This is enough CO_2 to increase the atmospheric concentration of this gas by 1% per year. Interestingly, less than half of this CO_2 stays airborne, on average. The rest is apparently being absorbed by natural processes at the surface, whose identity and location are poorly understood. Ground-based CO_2 measurements accurately record the global atmospheric CO_2 budget and its trends, but do not have the spatial resolution or coverage needed to identify the "sources" emitting CO_2 into the atmosphere or the natural "sinks" absorbing this gas at the surface.

One way to improve the resolution and coverage of these measurements is to collect precise observations of CO_2 from an orbiting satellite. The Orbiting Carbon Observatory–2 (OCO-2) is NASA's first satellite designed to address this need. OCO-2 was successfully launched on July 2, 2014. By early September of 2014, its high resolution imaging grating spectrometers were recording almost a million soundings over Earth's sunlit hemisphere each day. Observations recorded over the first 18 months of operation clearly show the most robust features of the atmospheric carbon cycle, including the intense northern hemisphere spring drawdown, as land plants rapidly absorb CO_2 to form new leaves, stems, and roots. They also show enhanced CO_2 over regions with intense fossil fuel combustion, such as the east coast of China and the U.S. As these measurements are analyzed by the carbon cycle science community, they are expected to reveal far more detail about the processes controlling the atmospheric CO_2 buildup. This talk will describe the OCO-2 mission, summarize its measurement approach, and present results from its first 18 months in operation.