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

David Crisp*¹

¹Jet Propulsion Laboratory - California Institute of Technology (JPL) – Jet Propulsion Laboratory
4800 Oak Grove Drive Pasadena, California 91109, États-Unis

Résumé

Fossil fuel combustion, deforestation, and other human activities are adding almost 40 billion tons of carbon dioxide (CO₂) to the atmosphere each year. This is enough CO₂ to increase the atmospheric concentration of this gas by 1% per year. Interestingly, less than half of this CO₂ 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 CO₂ measurements accurately record the global atmospheric CO₂ budget and its trends, but do not have the resolution or coverage needed to identify the "sources" emitting CO₂ 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 large numbers of precise observations of CO₂ 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 2 years 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 CO₂ to form new leaves, stems, and roots. They also show enhanced CO₂ over regions with intense fossil fuel combustion, such as the east coast of China and the U.S. and provide a high resolution global description of the atmospheric CO₂ response to the intense 2015 El Niño. 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 CO₂ buildup. This talk will describe the OCO-2 mission, summarize its measurement approach, and present results from its first 24 months in operation.

*Intervenant