

Methods for retrievals of CO₂ mixing ratios from JPL Laser Absorption Spectrometer flights during a summer 2011 campaign. Robert Menzies, Gary Spiers and Joseph Jacob, NASA JPL (USA).

ABSTRACT

The JPL airborne Laser Absorption Spectrometer instrument has been flown several times in the 2007-2011 time frame for the purpose of measuring CO₂ mixing ratios in the lower atmosphere. This instrument employs CW laser transmitters and coherent detection receivers. The lasers transmit at carefully controlled wavelengths in the 2- μ m spectral region. The Integrated Path Differential Absorption (IPDA) method is used to retrieve a weighted CO₂ column mixing ratio. Extremely high measurement precision is desired. We present key features of the evolving LAS signal processing and data analysis algorithms, the calibration/validation methodology, and noise reduction methods. Results from the 2011 campaign in various Midwestern U.S. locations are discussed. These include high spatial resolution plume detection during a leg downwind of the Four Corners power plant in New Mexico.