Mapping Global CO2: Impact of Temporal Variability on Geostatistical Gap-Filling for the Orbiting Carbon Observatory (OCO)

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This presentation will describe results from a new project whose goal is to produce the first full-coverage maps of column integrated CO_2 dry air mole fraction (XCO_2) using data available from OCO. The focus will be on analyzing the impact of temporal variability of XCO_2 on the ability to merge data from multiple days/orbits within a single 16-day OCO repeat cycle. Current gap-filled maps from modeled OCO-like data have been created under the assumption that all the measurements within a repeat cycle are representative of a single, static time. This investigation assesses the effect of ignoring temporal variability in the underlying XCO_2 fields. We propose new techniques for incorporating temporal variability into the estimation of complete, gap-filled maps and their uncertainties. These techniques are still strongly data-driven and do not rely on atmospheric transport models or estimates of surface fluxes of carbon dioxide. Comparative results from candidate geostatistical gap-filling techniques considering temporal effects applied to modeled data representative of future OCO data will be included.