

Title: ARM-ACME projects in the SGP and NSA

Abstract: We present airborne (ARM-ACME) observations and analysis of atmospheric trace gases in the Southern Great Plains (SGP) and the North Slope of Alaska (NSA). The goals of this measurement program are to improve understanding of: (a) land-atmosphere carbon exchanges in the SGP and NSA regions; (b) how CO₂, CH₄ and associated water and energy fluxes influence CO₂ and CH₄ concentrations; (c) how greenhouse gases are transported on continental scales; and (d) investigate the impact of a fast changing climate on the carbon cycle in the NSA. During flights, we measure CO₂, CH₄ and meteorological data continuously and collect flasks for a rich suite of additional gases: CO₂, CH₄, CO, N₂O, ¹³CO₂, ¹⁴CO₂, carbonyl sulfide (COS), and many trace hydrocarbon species. The main objectives of these weekly flights are to quantify trends and variability in atmospheric concentrations of CO₂, CH₄, and other greenhouse gases in North America and to improve understanding and modeling of boundary layer - free troposphere exchange dynamics.