A REGIONAL-SCALE ANALYSIS OF THE ANTHROPOGENIC CONTRIBUTIONS TO CO_2 IN THE MIDWEST: A PRELIMINARY LOOK AT THE SUMMER 2004 ICARTT DATA

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ABSTRACT

Atmospheric observations obtained during intensive field experiments are used to characterize regional sources and test data assimilation techniques. In this study, the STEM-2K1 (Sulfur Transport Eulerian Model, version 2K1) and its adjoint model are applied to the analysis of observations from aircraft platforms made during the summer 2004 ICARTT (International Consortium for Atmospheric Research on Transport) experiment. Observed ratios between CO_2 and tracers and model derived airmass markers are used to identify emission signatures, indicating the influence of different sources. Model derived influence functions along with assimilated transport model results of anthropogenic tracers are used to characterize the anthropogenic CO_2 emissions in the Midwest during the summer 2004 period. This analysis gives an initial look at the Midwest domain which is the focus of the expansion of NOAA Climate Monitoring and Diagnostic Laboratory's tall tower observation network and the upcoming Mid-Continent NACP Intensive Campaign.