

Recent Results from the NOAA ESRL Tall Tower Network

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The primary objective of the NOAA Earth System Research Laboratory's Tall Tower greenhouse gas monitoring network is to obtain regionally representative carbon flux estimates for the North American continent. Tall tower CO₂ mixing ratio measurements are sensitive to upwind fluxes over scales of hundreds of kilometers. Mixing ratios of CO₂ and CO are measured semi-continuously at the towers, and the WKT tower site near Moody, TX has recently been equipped with sensors to measure radon and O₃. Daily flask samples are collected at the WKT and LEF towers and analyzed for CO₂, CO, CH₄, SF₆, N₂O, H₂, stable isotopes of CO₂ and CH₄ and a variety of halocarbon and hydrocarbon species. We have used the Stochastic Time Inverted Lagrangian Transport (STILT) model to investigate upwind influences on the tower observations. CO measurements provide an indicator of polluted air masses, and we will present a summary of the frequency and origin of pollution events observed at the towers. We will present an analysis of the primary factors contributing to observed CO₂ variability along with average seasonal and diurnal cycles of CO₂ at the tower sites. Tower measurements are among the primary North American data constraints for ESRL's CarbonTracker, a new carbon data assimilation system that produces regional to global carbon flux estimates with up to weekly resolution.

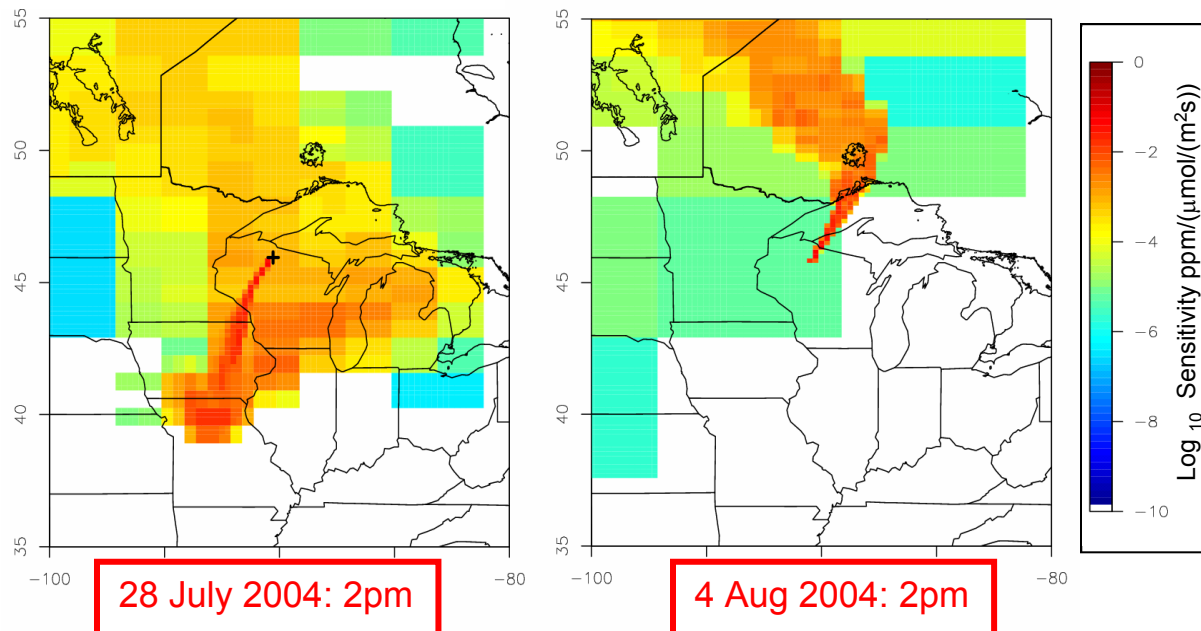


Figure 1. Sampling footprints for the LEF tall tower site in Park Falls, WI. Footprints were computed using the STILT model. Variations in wind direction result in sampling of a variety of ecosystem types from a single site.