

Title: Influence of Biotic Exchange and other Sources on Atmospheric CO<sub>2</sub> Concentrations in a New England Deciduous Forest (Ameriflux site) utilizing Other Trace Gases Measurements

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We will continue to collect data on our suite of fourteen gases (CH<sub>4</sub>, CO, N<sub>2</sub>O, H<sub>2</sub>, CFC-11, CFC-12, CFC-113, CHCl<sub>3</sub>, CH<sub>3</sub>CCl<sub>3</sub>, C<sub>2</sub>HCl<sub>3</sub>, C<sub>2</sub>Cl<sub>4</sub>, halon-1211, CCl<sub>4</sub>, and SF<sub>6</sub>) measured by the Forest and Atmosphere Chromatographs for Trace Species (FACTS) gas chromatograph at 24-minute intervals. We will monitor the changes in halocarbon emissions mandated by the Montreal Protocol and its subsequent amendments. Estimates of the emissions of fossil fuel CO<sub>2</sub> will continue. Flask sampling for the chlorinated solvents (CH<sub>2</sub>Cl<sub>2</sub>, C<sub>2</sub>Cl<sub>4</sub>, CHCl<sub>3</sub>), and methyl halides (CH<sub>3</sub>Cl and CH<sub>3</sub>Br), hydrochlorofluorocarbons (HCFCs), and hydrofluorocarbons (HFCs) will continue.

The basic hypothesis of the work is whether or not there have been changes in trace gas emissions over Harvard Forest, Massachusetts as a result of changes in environmental protocols (Montreal, Kyoto), economics, land use, and other factors. We are able to calculate emissions of carbon dioxide from fossil fuel consumption and emissions of a number of ozone depleting species (ODS) regulated by the Montreal Protocol. Many of these ODS are also greenhouse gases. Is Harvard Forest's emissions representative for the United States as a whole? Three scientific papers have been published in the *Journal of Geophysical Research* regarding emissions measured at Harvard Forest. All of our FACTS GC data are available up to the end of 2001 at [ftp://ftp.as.harvard.edu/pub/nigec/HU\\_Wofsy/hf\\_data/FACTS\\_data/](ftp://ftp.as.harvard.edu/pub/nigec/HU_Wofsy/hf_data/FACTS_data/).

The Forest and Atmosphere Chromatograph for Trace Species (FACTS) is a customized instrument designed to measure fourteen atmospheric gases at the Harvard Forest site. The four-channel gas chromatograph instrument has been in operation since 1996 and is measuring gases that have an impact on climate forcing, stratospheric ozone depletion, and air quality. The goal of the project is to determine emissions of these trace gases, examine the correlations of these gases with each other and carbon dioxide, and use these relationships to understand the cycling of carbon over Harvard Forest. Polluted air from the New York City-Washington D.C. metropolitan corridor is frequently measured at the Harvard Forest site. By comparing these polluted measurements to that of the background "clean" air measurements, emissions and air quality assessments can be made. This information is useful to public policy decision makers in crafting and modifying environmental protection laws and international agreements.