Emissions of Radical Precursors and Related Species from Urban Highway Traffic in Houston, Texas - Implications for Air Quality Modeling

Bernhard Rappenglueck (1), Sergio Alvarez (1), Julia Golovko (1), Graciela Lubertino (2), Beata H. Czader (1), Luis Ackermann (1), Richard Fuller (1), and Leonardo Pedemonte (1)

(1) University of Houston, Earth and Atmospheric Sciences, Houston, TX 77204,United States (brappenglueck@uh.edu), (2) Houston-Galveston Area Council, Houston, TX 77027, United States

Nitrous acid (HONO) and formaldehyde (HCHO) are known to be important precursors for radicals and are believed to favor ozone formation significantly. So far only scarce traffic emissions data that includes both compounds is available. However, this knowledge is needed to further refine and validate air quality modeling as well as to predict/simulate impact of theses emissions on air quality.

Here we will report measurements of HCHO, HONO, CO, CO2, NO, NO2, NOX, peroxyacyl nitrates (PANs), volatile organic compounds (VOCs) and meteorological parameters which were performed in the immediate vicinity of a highway junction in Houston for several months in 2009. Ratios of various trace gas species will be shown with respect to different environmental conditions (e.g. night vs. day; low vs. high relative humidity; low vs. high ambient temperature) and traffic flow. The observational data will be compared to emission estimates from currently available mobile emissions models and implications for the Weather Research Forecast – Community Multiscale Air Quality (WRF-CMAQ) modeling system will be shown.