Air Quality Modeling Study of Ozone Radical Precursors in Houston

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The Houston-Galveston area has one of the highest ozone concentrations in the U.S., often exceeding the U.S. National Ambient Air Quality Standard for ozone. Photochemical modeling of ozone formation in the Houston area generally underestimates the concentrations of free radical precursors contributing to ozone formation. There are unresolved questions about the quantitative contribution of direct emissions and of atmospheric reaction products to the formation of compounds that contribute to the free radical chemistry producing Houston's high ozone.

Here we present modeling results using Weather Research Forecast – Community Multiscale Air Quality (WRF-CMAQ) modeling system to analyze chemical processes for selected periods in 2009, including process analysis studies along trajectories linking two sites in the Houston area, one site in the highly industrialized area of the Houston Ship Channel and a receptor site at the Moody Tower on the University of Houston campus. Furthermore, WRF-CMAQ results will be utilized to elucidate the relative importance of photolysis of ozone, nitrous acid (HONO), formaldehyde (HCHO), and hydrogen peroxide (H_2O_2) as radical sources in the Houston atmosphere.