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Urban impacts on regional carbonaceous aerosols: investigation of seasonal urban outflow impacts using trajectory analysis, OCEC and absorption parameters

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It is of high interest to determine the impact of large urban centers on regional aerosol. However, it is difficult to ascertain impact using only chemical or meteorological data. A combination of techniques would enable more accurate assessment of the frequency, magnitude and character of the urban outflow at a background site. The study site is centralized in Texas, and is regularly 12-24h downwind of either the Dallas-Fort Worth metropolitan area (4.2 million) or the Houston metropolitan area (4 million). Back trajectory analysis (BT), chemical characterization (organic and elemental carbon - OCEC), mass absorption cross-section (MAC) and the light attenuation coefficient (ATN) will be presented for a yearlong sampling campaign (May 2011-Apr 2012). Correlations among these factors (BTs, OCEC, MAC and ATN) will be used to begin to assess urban outflow from these two metropolitan centers on the regional receptor site. Seasonal differences in the OCEC, MAC and ATN transported from these urban centers will be explored in greater detail during a summer and winter intensive. Preliminary data (May-Nov 2011) indicates EC to OC ratio of 0.015 with an r2 = 0.75. Summer drought conditions in 2011 resulted in stable air mass movement in the region, with consistent southerly winds and high potential for Houston outflow impacts. Conclusions will be supported with gaseous pollutant data from local monitoring sites including ozone, NO_x and CO.