

Addendum to Response to Comments from the US EPA on an Exceptional Events Request

This addendum is provided as a follow-up to the letter and accompanying report sent to EPA on October 9, 2012, which requested an exceptional event designation due to the Pagami Creek Fire in 2011. The original report is titled *Documentation in Support of a Request to Designate the PM_{2.5} Episode of Eastern Wisconsin September 13 – 14, 2011 as an Exceptional Event* (October 8, 2012).

Figure 12 in the original report shows data from the aethalometer at the Milwaukee DNR Southeast Region Headquarters monitoring station (55-079-0026). The aethalometer measures black carbon particulate matter, which is a primary component of wood smoke and diesel emissions. This instrument measures optical adsorption at two focal wavelengths for black carbon (BC - 880 nm) and ultra-violet particulate matter (UVPM - 370 nm). The difference between attenuation at each of these wavelengths (UVPM – BC), referred to as Delta-C (DC), allows differentiation between emission sources, wherein large positive values of DC indicate high levels of organic compounds, which are associated with wood smoke (Wang et al. 2011).

Data from Milwaukee SER HQ in Figure 12 shows hourly PM_{2.5} along with Delta-C from the aethalometer during the month of September 2011. Concurrent spikes in both DC and hourly PM_{2.5} on September 13th coincide with the impact of the Pagami Creek fire smoke plume in the Milwaukee area and at the monitoring site.

Figure 1, below, is a supplement to Figure 12 from the October 2012 submittal. Figure 1, using data from the Milwaukee 16th St sampler, looks similar to Figure 12 from SER HQ. The aethalometer at Milwaukee 16th St. showed a marked increase in the Delta-C measurement on September 13th, the day on which the elevated PM_{2.5} concentration (44.8 µg/m³) was observed at the daily FRM sampler. The hourly Delta-C value on Sept. 13th remained elevated from 9:00 AM until 9:00 PM, at which point it began declining until the following morning on Sept. 14th. The maximum Delta-C value at Milwaukee 16th St., observed at noon, was 2860 ng/m³, compared to a high of approximately 2100 ng/m³ observed at Milwaukee SER HQ. Furthermore, the concurrence of the elevated Delta-C values and the PM_{2.5} concentration strongly suggests the influence of smoke from the Pagami Creek fire at the at Milwaukee 16th St. monitor during the Sept. 13th daily PM_{2.5} collection period.

Reference:

Wang, Y., P.K. Hopke and M.J. Utell, 2011: Urban-scale spatial-temporal variability of black carbon and winter residential wood combustion particles. *Aerosol and Air Quality Research*, 11:473–481

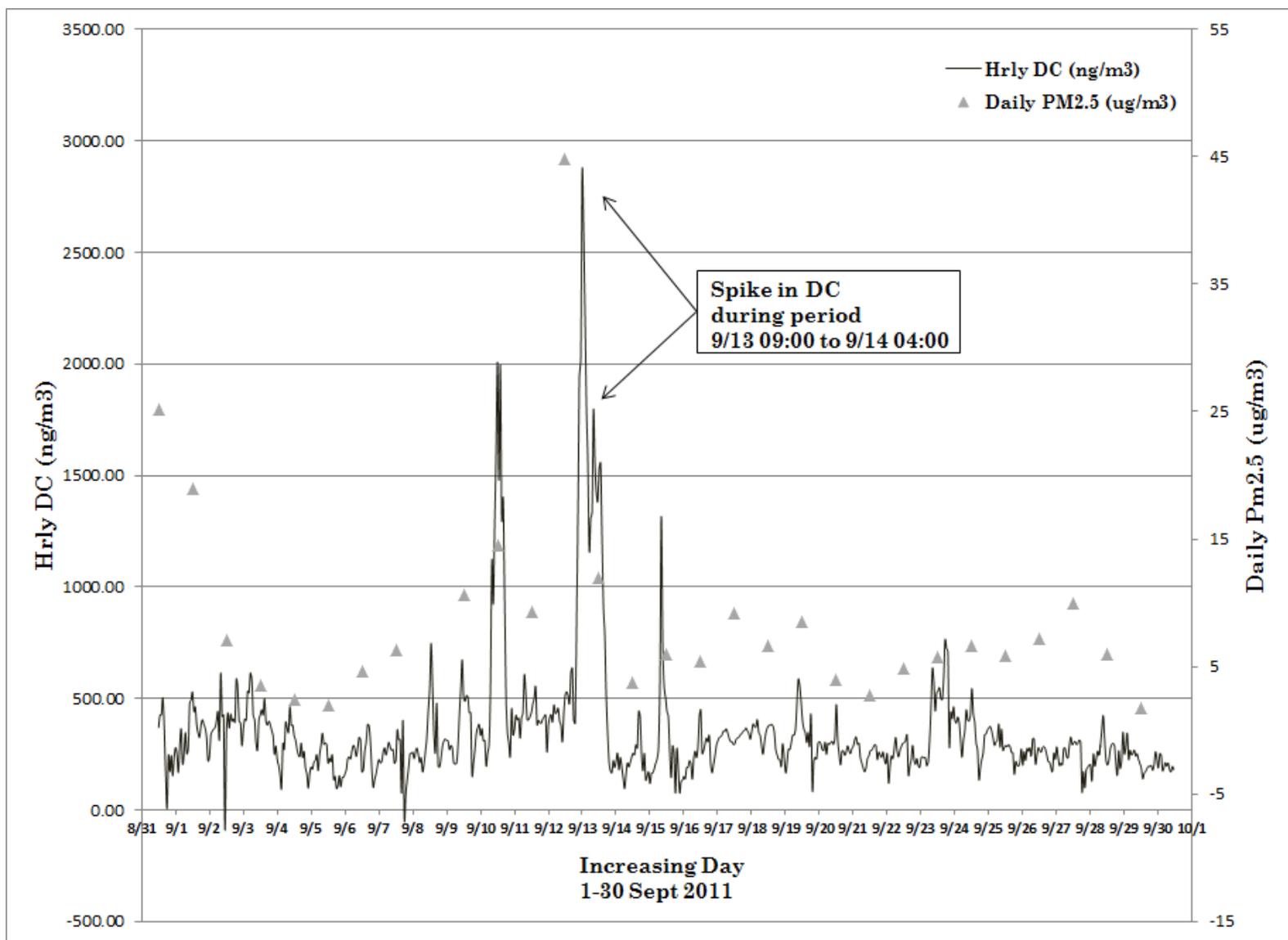


Figure 1. Aethalometer Delta-C (DC, nanograms/m³) data. DC = UVPM370nm minus black carbon (BC880nm). Positive DC values are associated with wood combustion. Negative DC values are associated with fossil fuel combustion.