NEW YORK
STATE OF
OPPORTUNITY

Department of
Environmental
Conservation

Peace Bridge Neighborhood Air Quality Study: 1st Data Review Meeting

January 27th 2015

Data Collection: Start Dates

Busti Avenue Site

- PM-2.5, Meteorological, Black Carbon (BC) started on August 11th
- Ultrafine Particle Data (UFP) valid data started September 24th.
- Volatile Organic Compounds (VOC) and Carbonyl sample collection started August 15th

PS 198

- BC started August 21st
- PM-2.5 started August 26th

Peace Bridge Traffic

- Vehicle transit and delay data available

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Instrumentation: Ultrafine Particle Number

- UFP range (0.001-0.1 Microns)
- API Model 651, TSI 3783 Water CPC
- Lower size cut 7nm (0.007 microns)
- 1 Micron Cyclone Inlet
- 2nd Unit is on Loan from the Manufacturer

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Instrumentation: PM-2.5 and Data Logger

Thermo Environmental Inc. TEOM 1400B

- 1-Hour Data Average
- Near-Real Time data Availability
- 2.5 Micron Cyclone Inlet
- Sample Collection at 50^0 C

Envidas Data Logger

- Provides data polling, storage and communication with central database

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Instrumentation: Aethalometer for Black Carbon

Magee Scientific Model AE22 and the newer Model AE33

- Measures light attenuation due to particle load on filter tape at 2 or 7 wavelengths
- Near-Real time data availability*
- Data must be post processed
- BC absorbs light 1000x other species
- UV – BC =DC (330 & 880nm)
- DC has been associated with combustion of biomass (indicator for wood smoke)

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Instrumentation: VOCs, Carbonyls

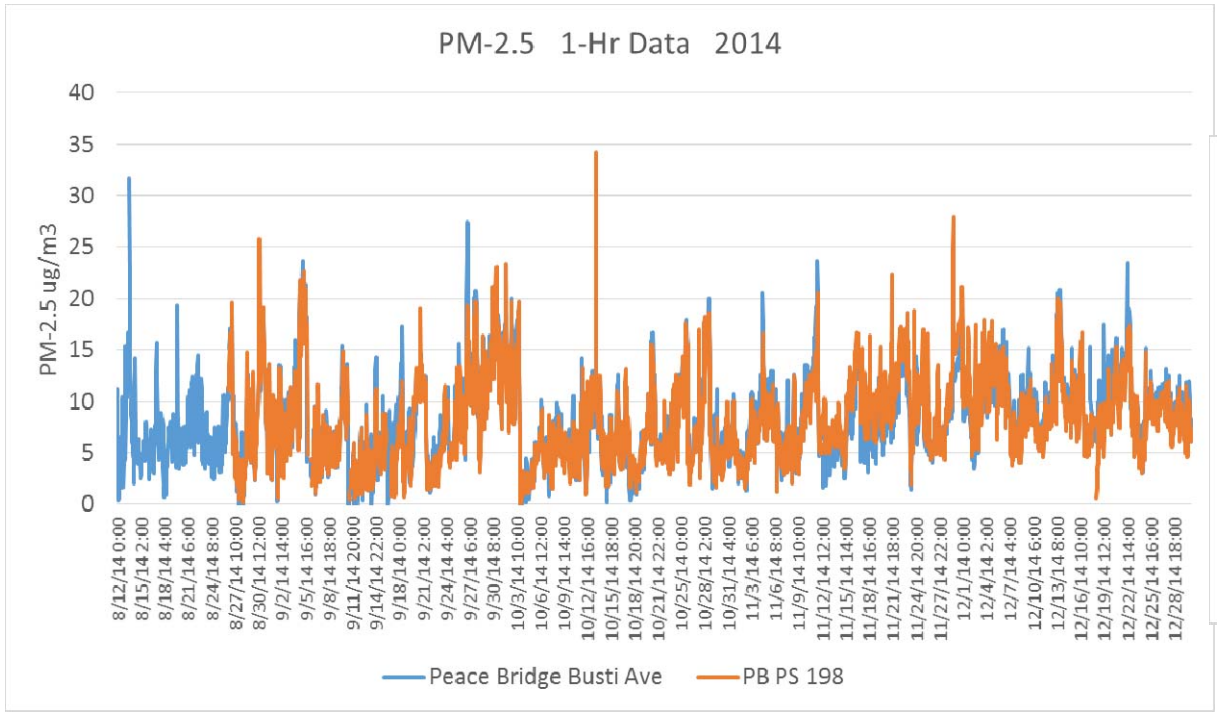
Computer controlled Canister Sampler

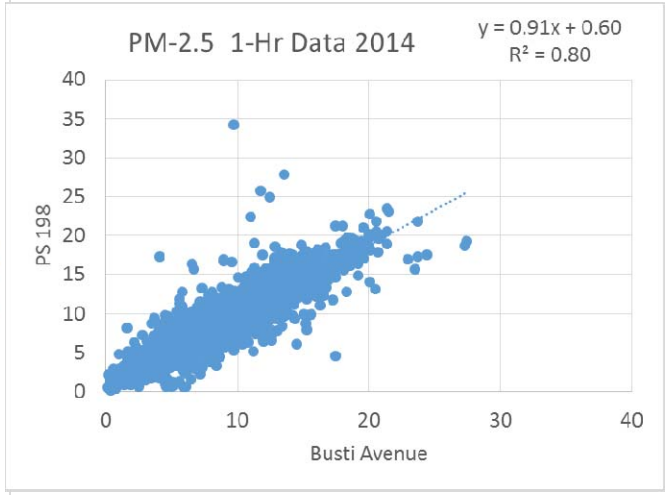
- 24-Hr sample collected once every 6 days
- Collects pressurized whole air samples

Computer controlled Carbonyl Sampler

- 24-Hr sample collected once every 6 days
- Captures carbonyls in reaction products in a DNPH cartridge

PM-2.5 Data: 1-Hr Averages





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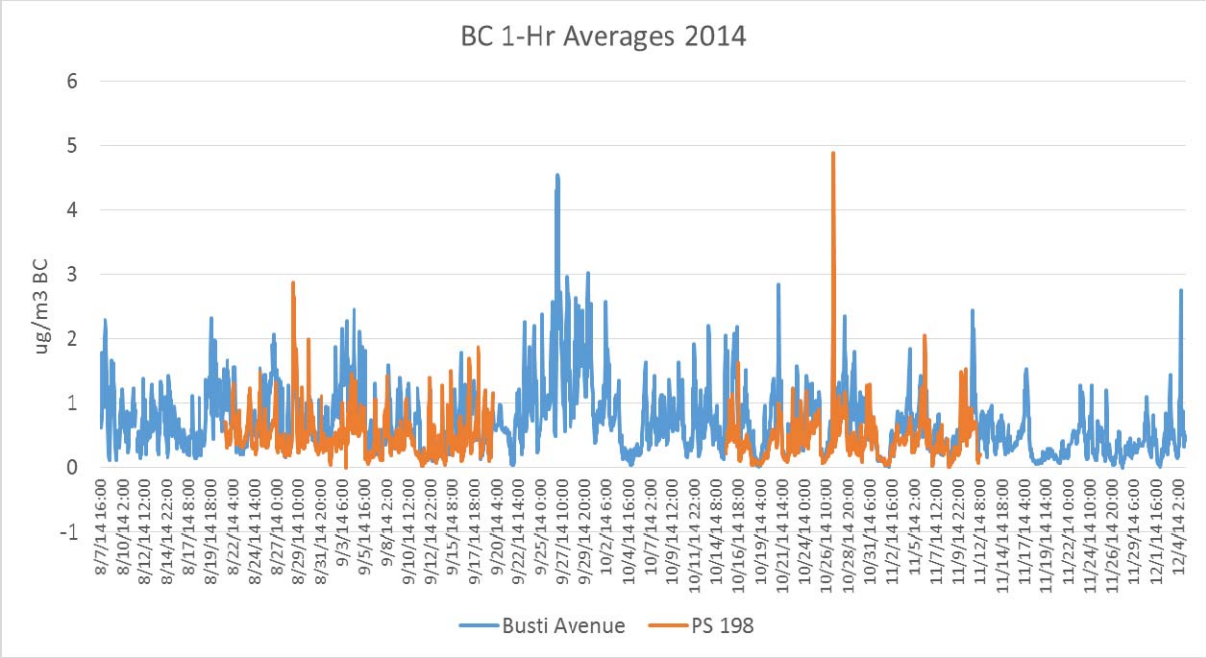
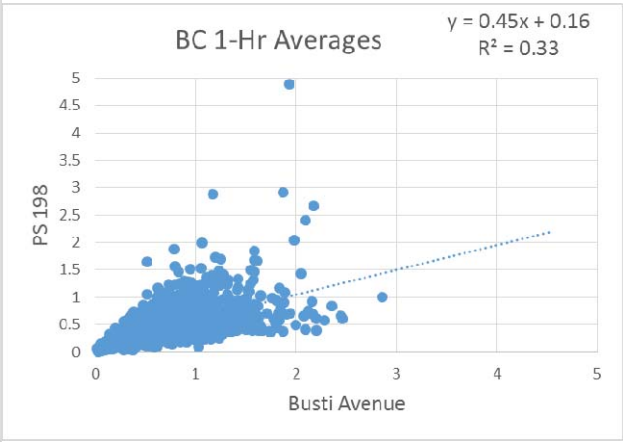
Black Carbon Data: 1-Hr Averages



PS 198 started later and has had equipment and power issues



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Black Carbon Data: 1-Hr Averages

Diurnal Profile of Hourly Averages

Data: August - November

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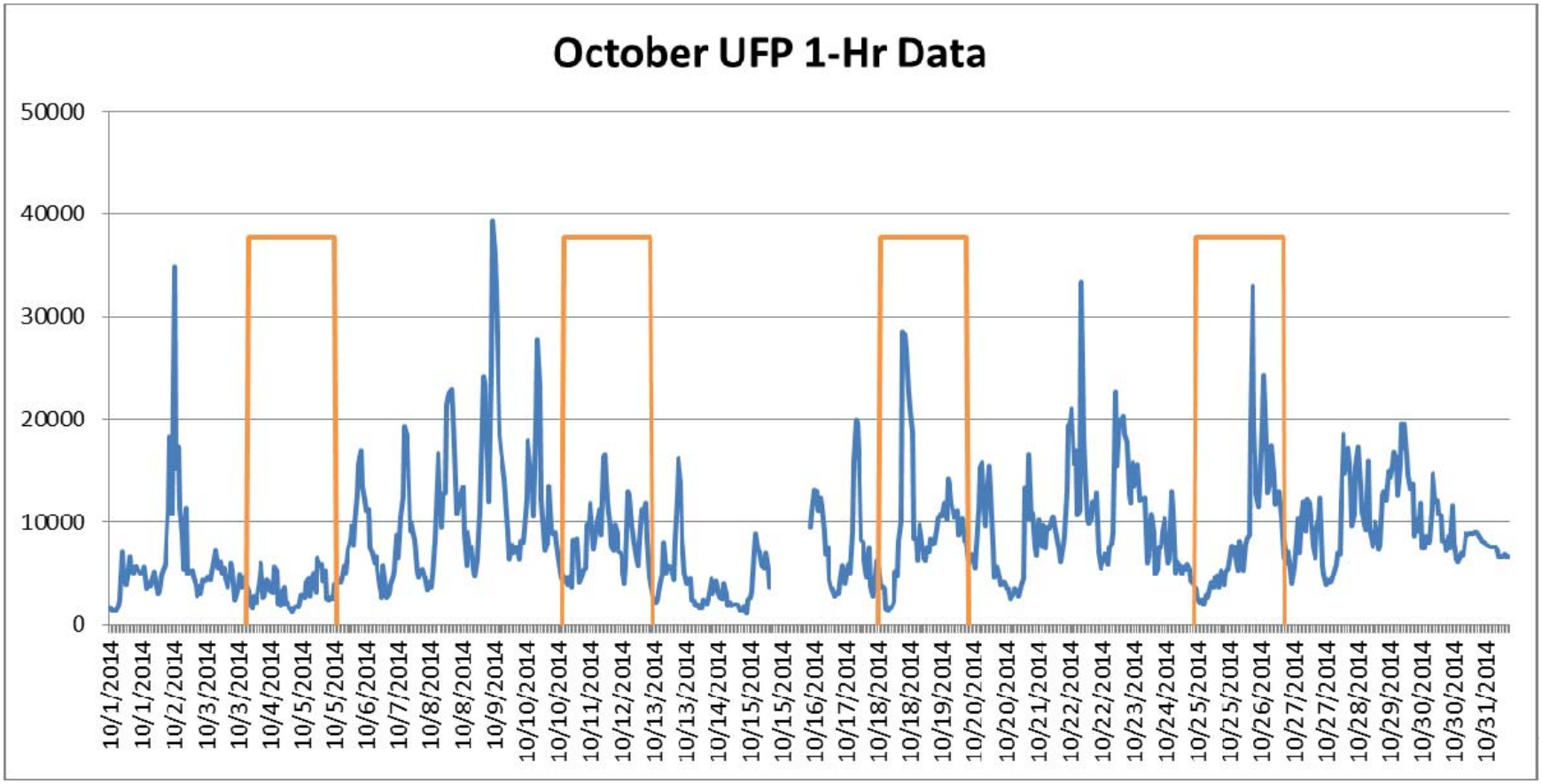
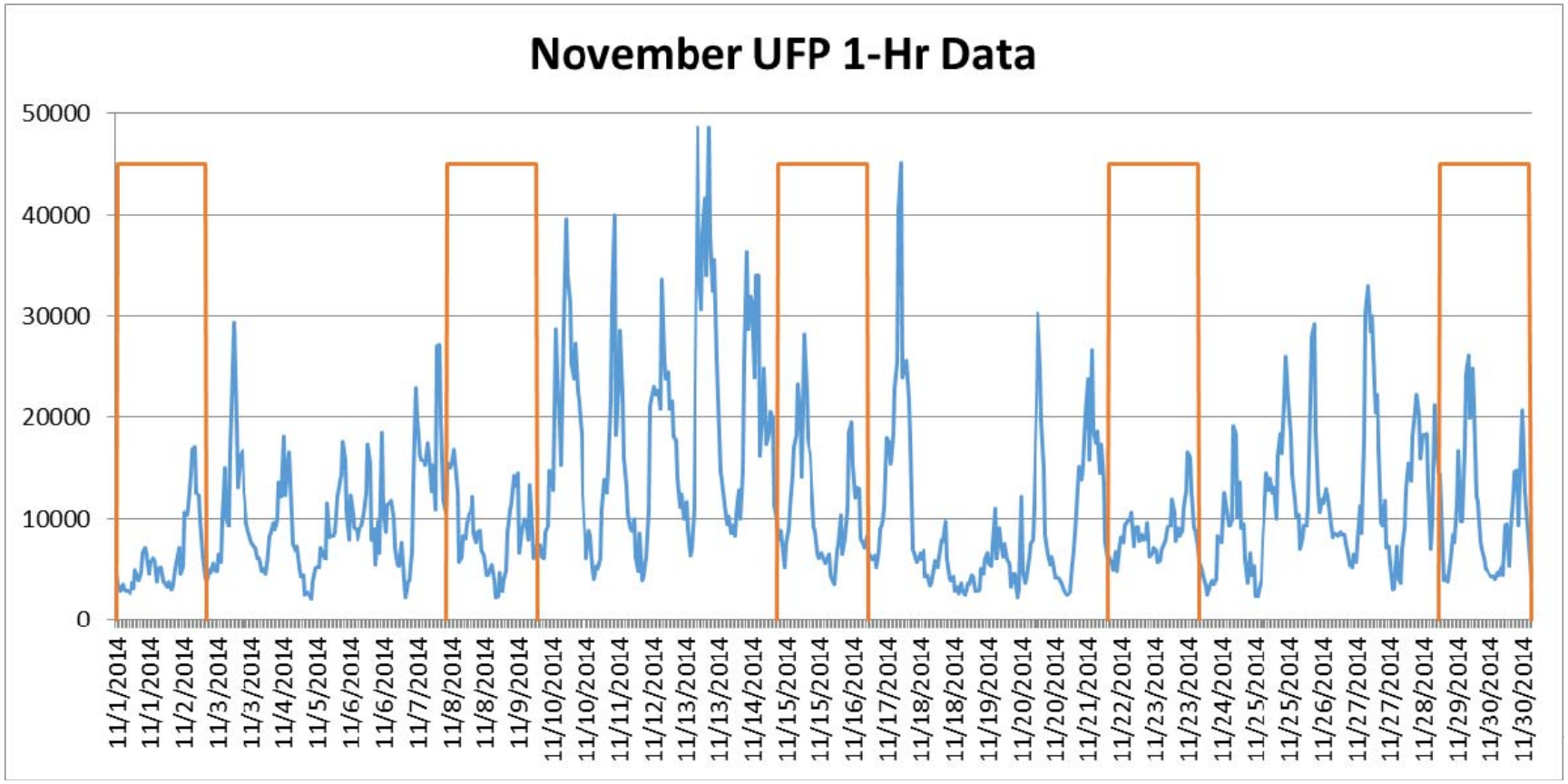
UFP Data: 1-Hr Averages

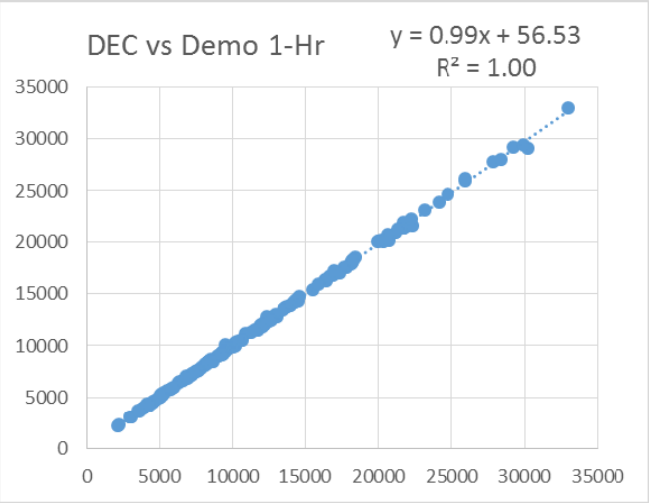


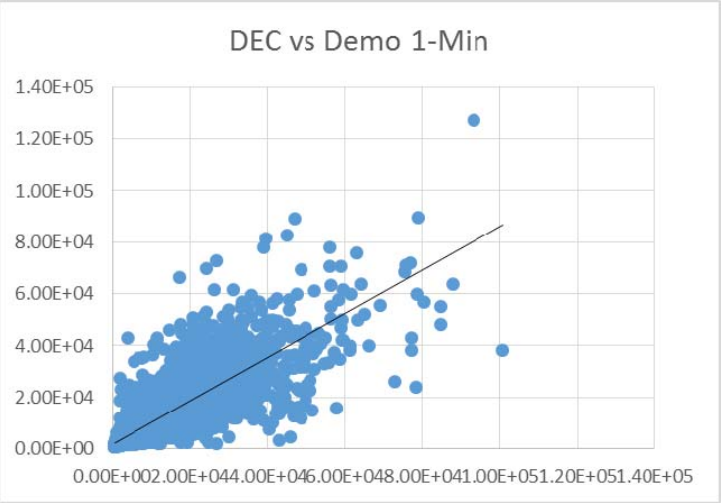
UFP Data: 1-Hr Averages



UFP Data: Precision

The two instruments demonstrate excellent precision when both are operating properly.





1-Min data is too variable to correlate with other pollutants.

Data 11/24 at 19:00 - 11/30 23:00

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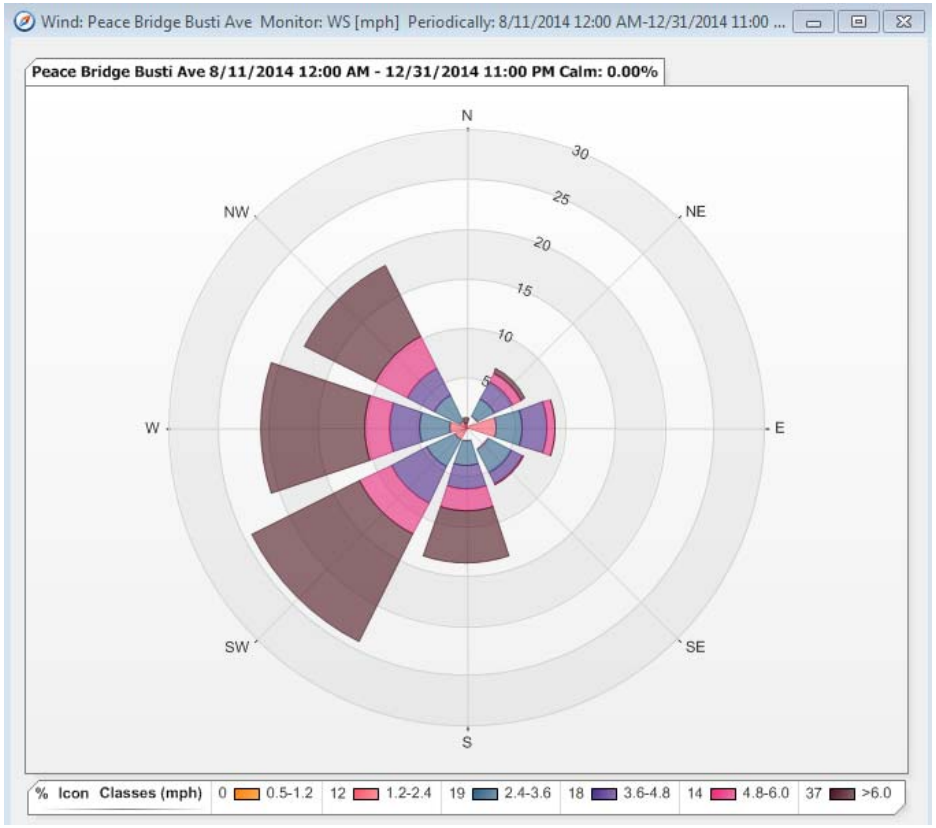
Meteorological Data: Wind Speed and Wind Direction (8/11 – 12/31)



Data are available averaged over 1-Min or 1-Hr

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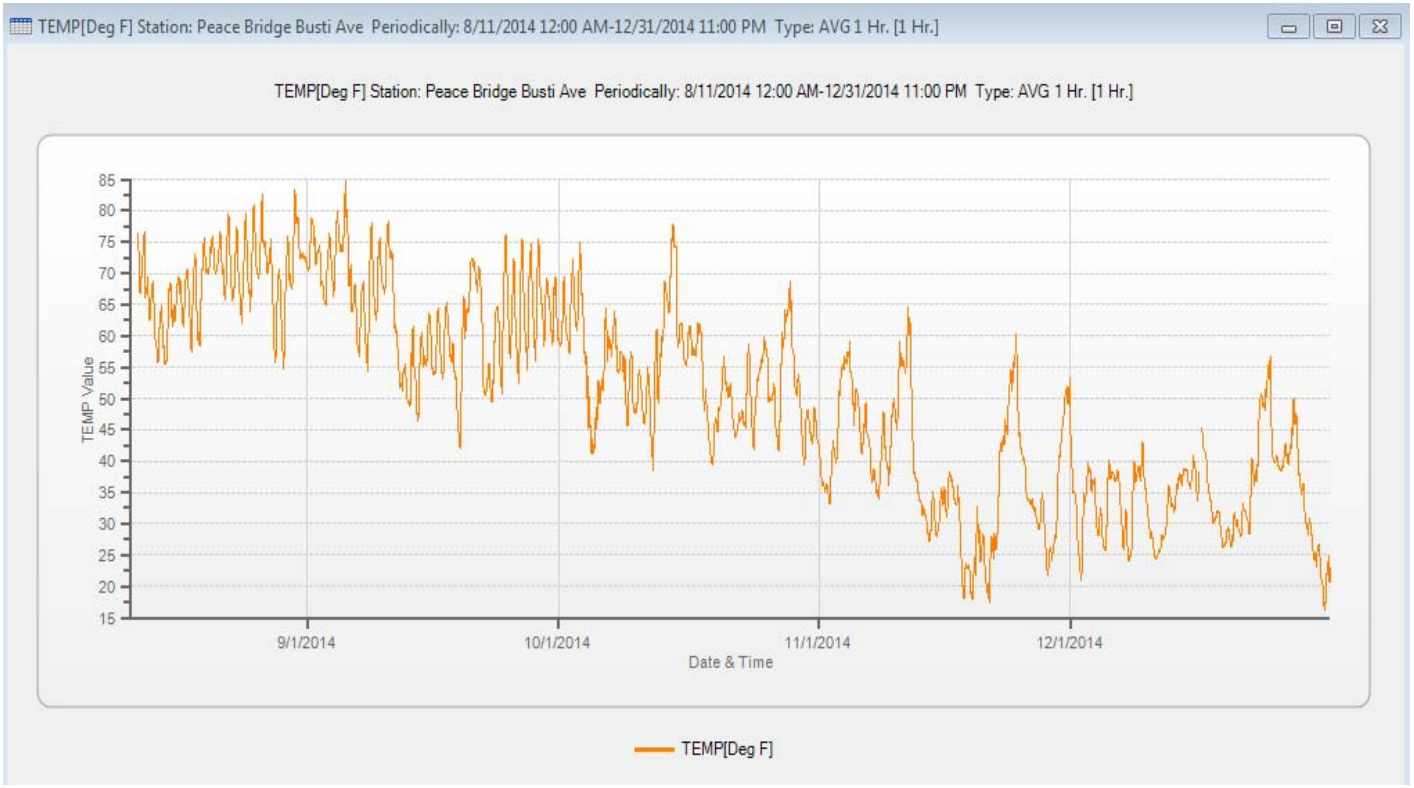
Meteorological Data: Temperature (8/11 – 12/31/2014)



Data are available averaged over 1-Min or 1-Hr

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How do we Interpret Bridge Traffic Data?

Available Data:

- 1-Hr Average Eastbound and Westbound Car, Truck and Bus transit data

  (East bound Bus traffic included in East bound auto totals)

- 1-Min Average Car and Truck Delay Time East and Westbound

  Data are reverse time stamp (for website presentation)

  Data must be put in chronological order and then averaged to 1-Hr

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How do we Interpret Bridge Traffic Data?

- Average Vehicle crossing time without delay (by class and direction)

Vehicle Transit data and Delay data can be combined (Each Hour)

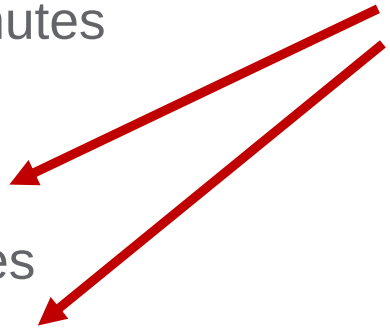
- Start with the number of vehicles/class/direction crossing the bridge
- Calculate the average delay for those vehicles for that hour
- Multiply number of vehicles x Delay (hrs) add the non delay transit time
- Result = number of idling/creeping vehicles by class, direction, hour

Peace Bridge Vehicle Transit Time without Delay

Normal Transit Times below are not included in delay times

- Canada bound cars = 4.37 minutes
- Canada bound NEXUS = 3.37 minutes
- Canada bound trucks = 5.12 minutes

- US bound cars = 4.88 minutes
- US bound NEXUS = 4.55 minutes
- US bound trucks = 6.05 minutes



The Focus is on US Bound Cars and Trucks

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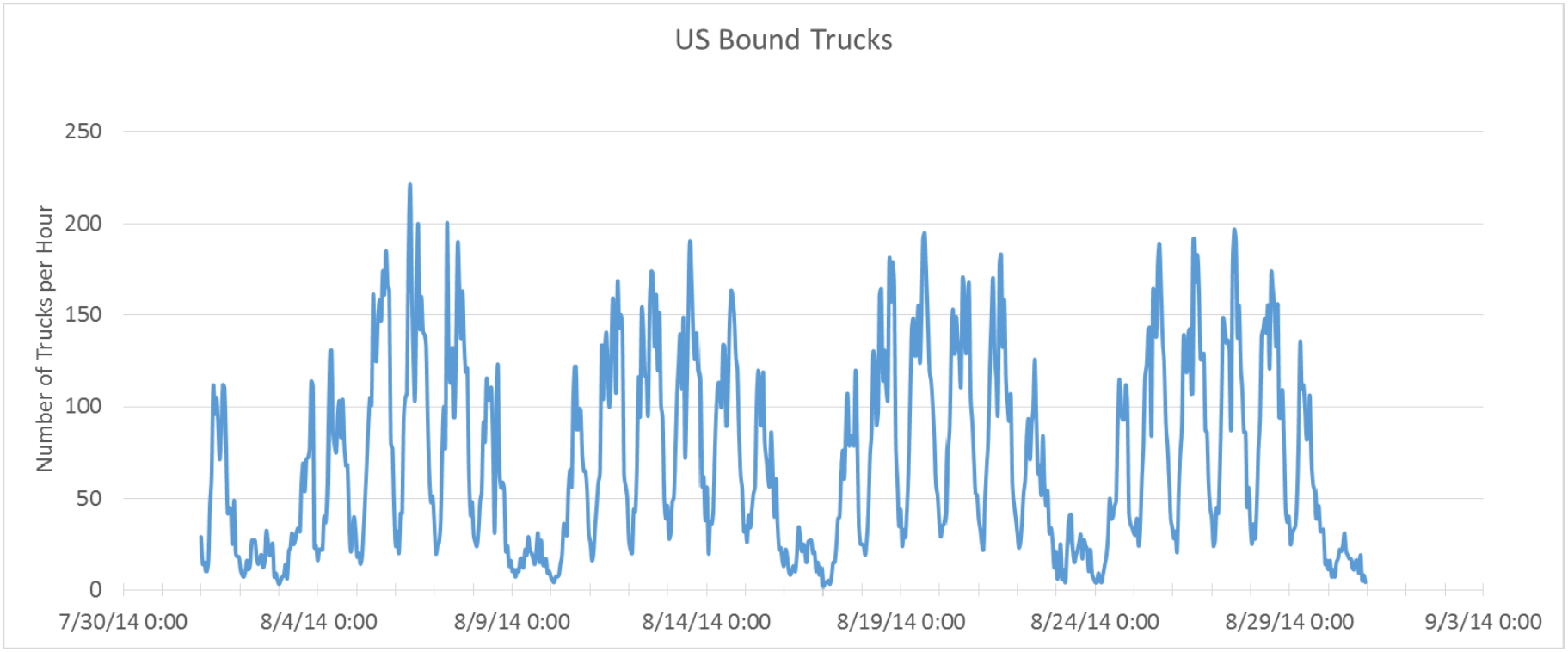
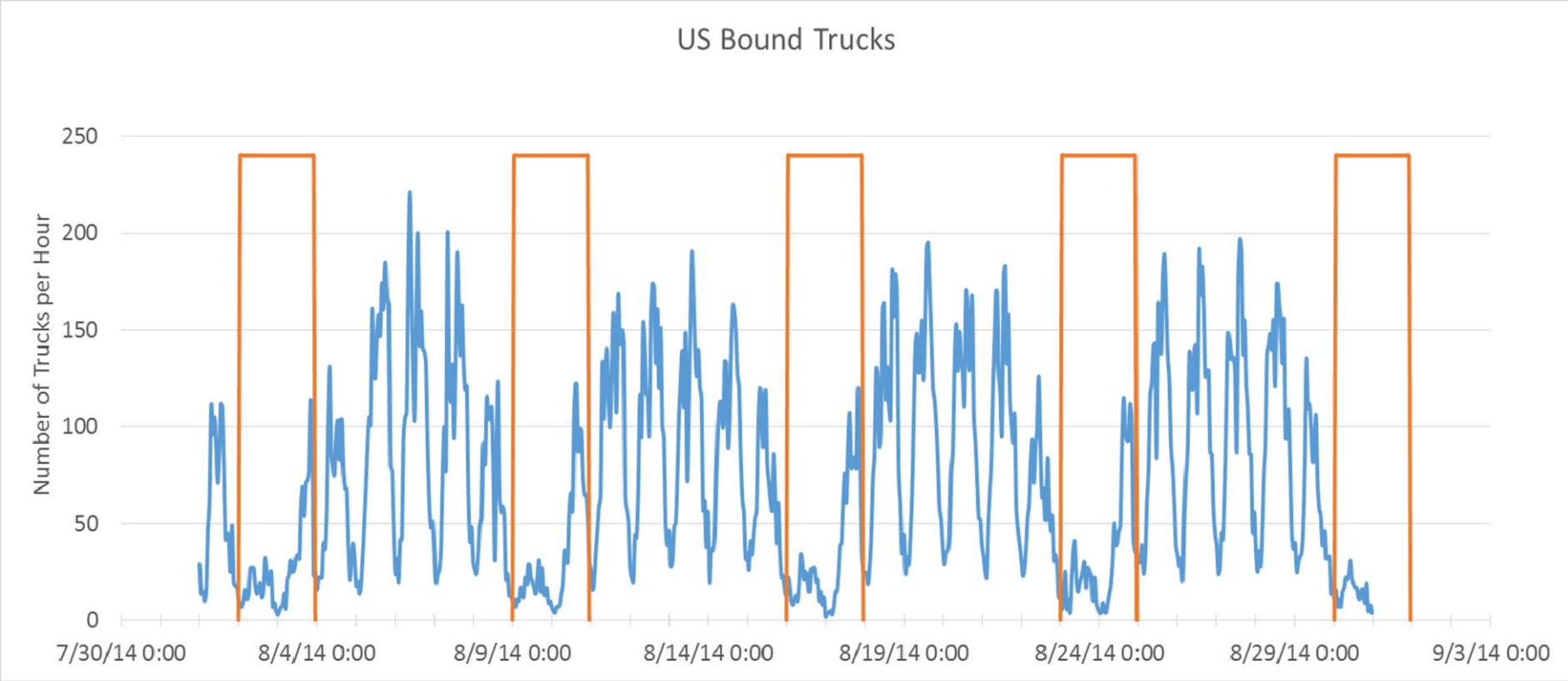
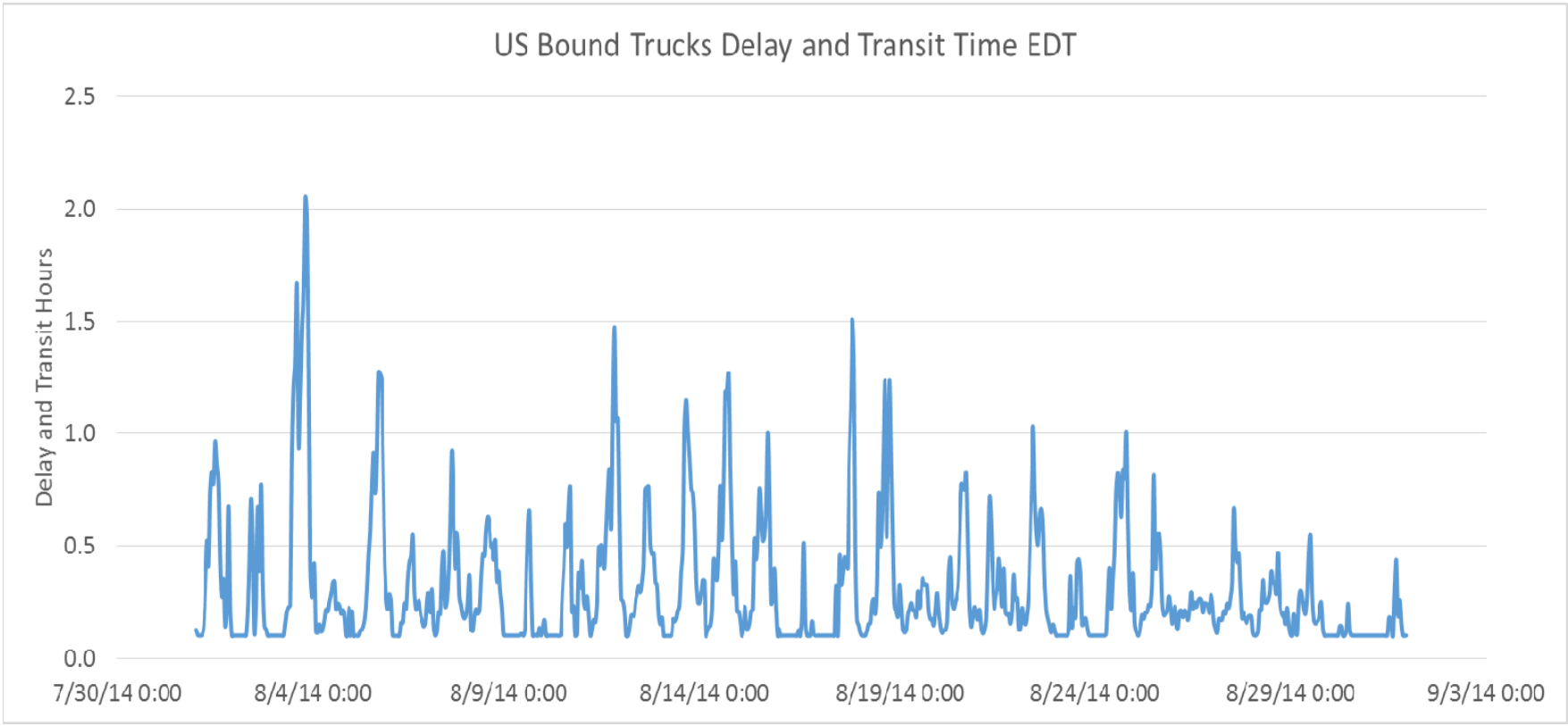
Traffic Data Analysis Example: August Eastbound Trucks



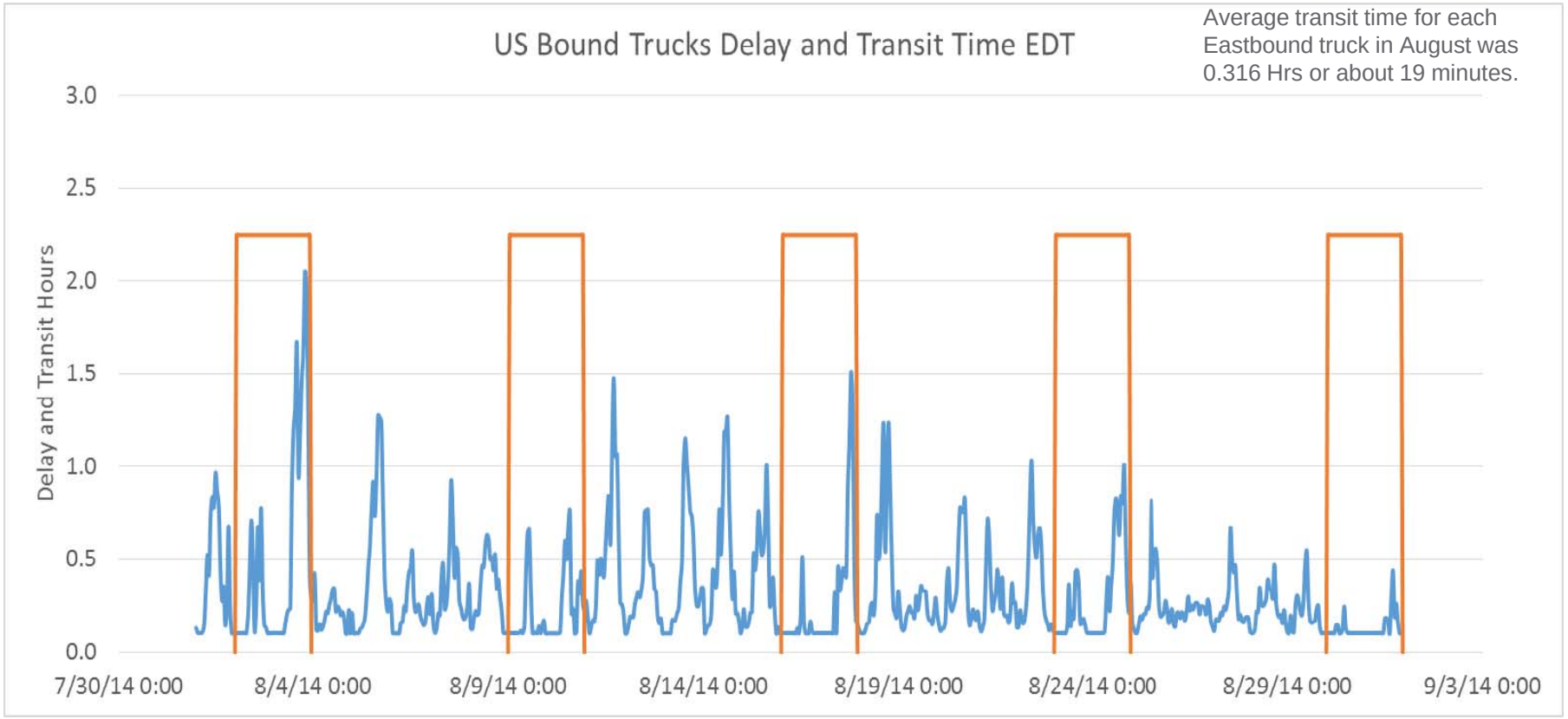
August Number of Trucks Eastbound with Weekends



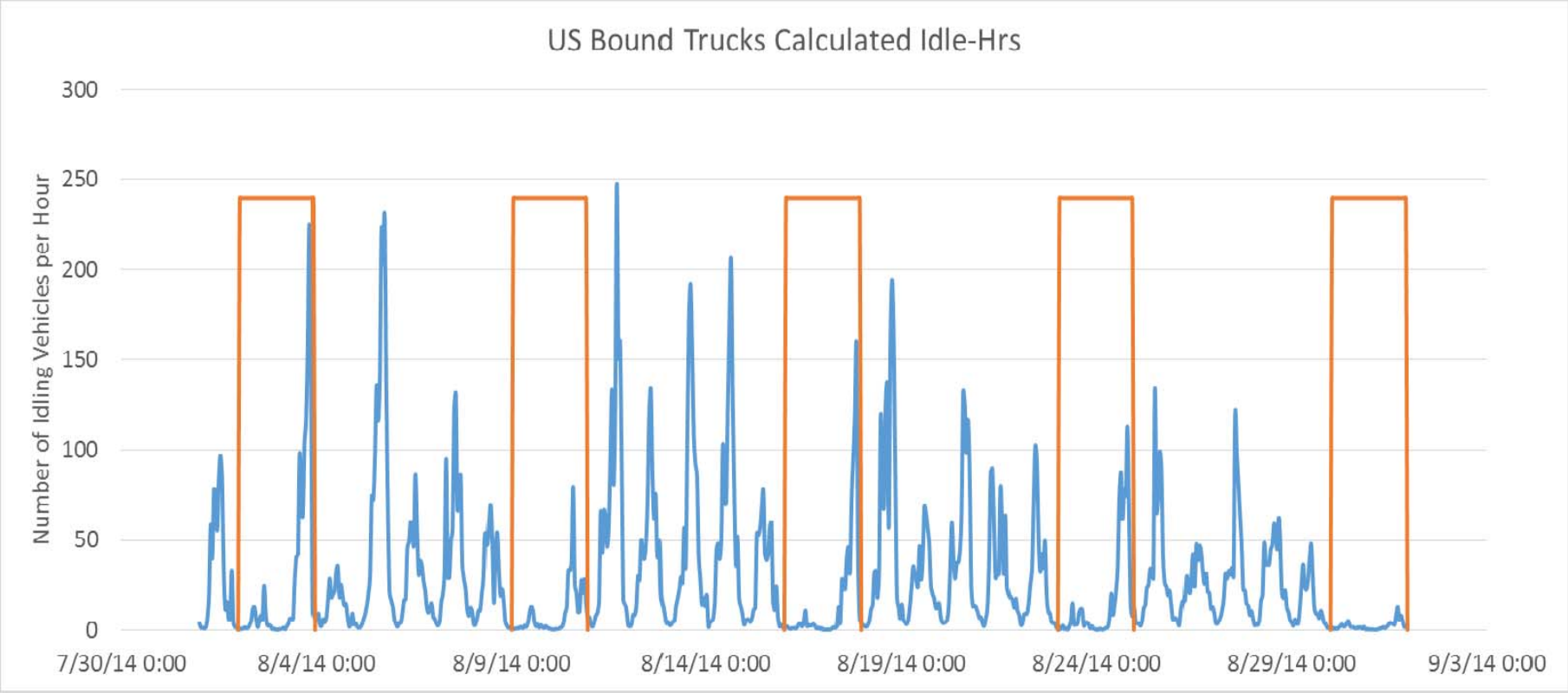
August Eastbound Trucks Delay and Transit Time



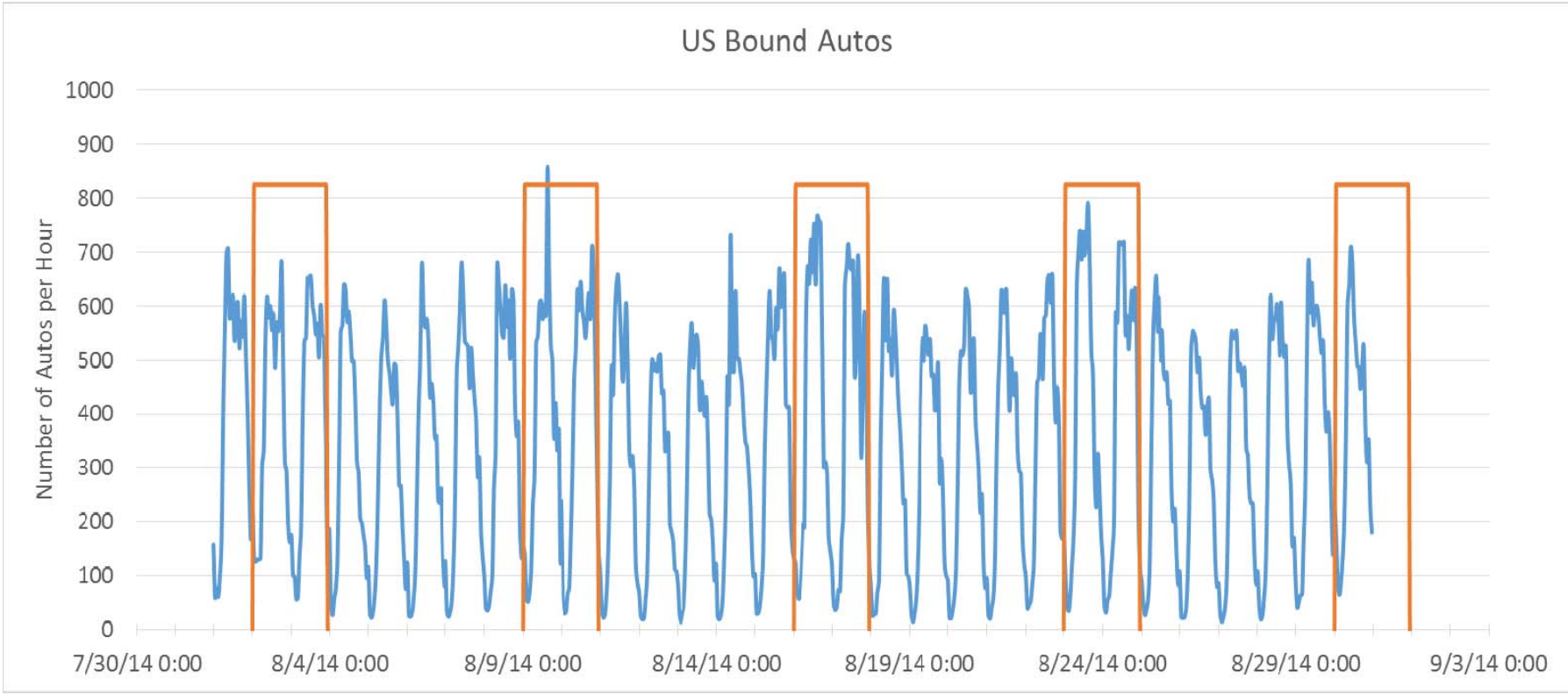
August Eastbound Trucks Delay and Transit Time



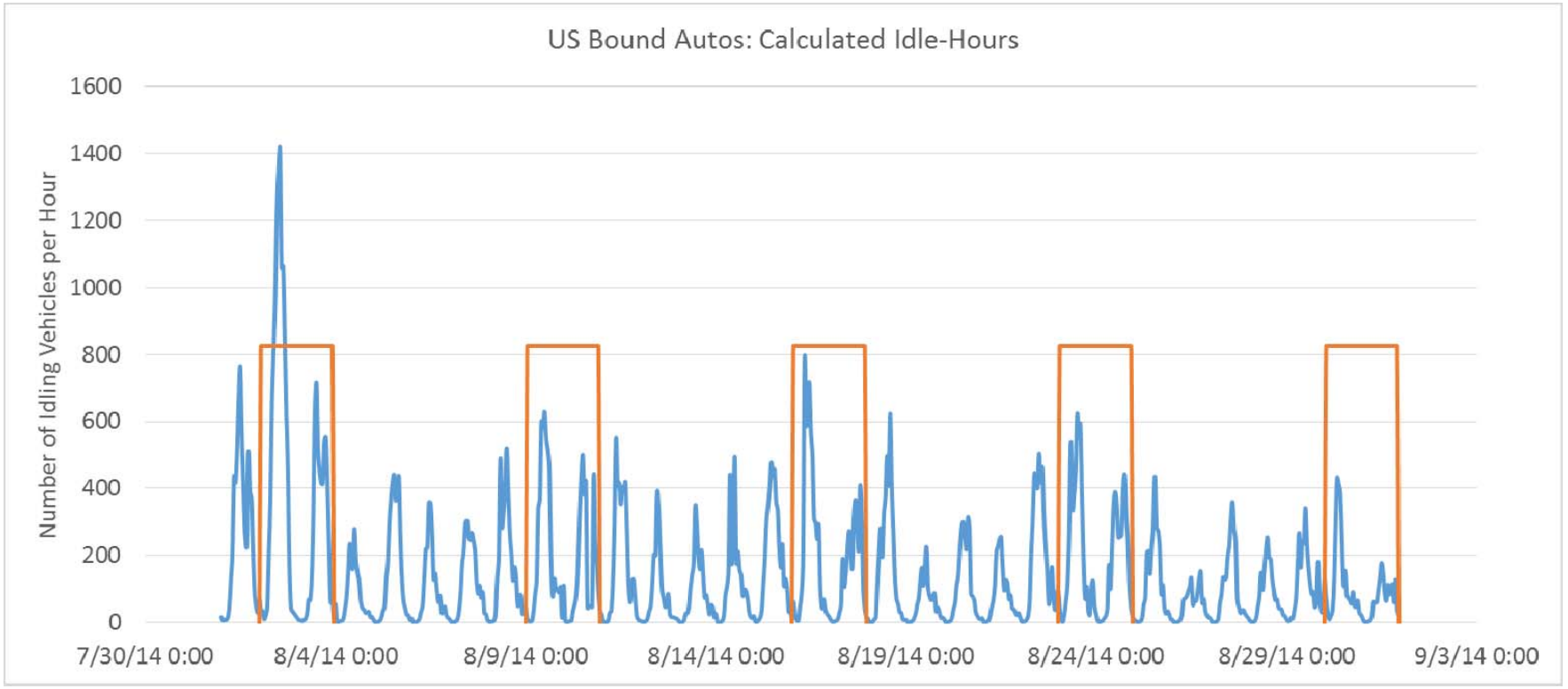
August Eastbound Trucks: Total Idle Time on Bridge



Traffic Data Analysis Example: August Eastbound Autos



August Eastbound Autos Delay and Transit Time



Traffic Analysis

Peace Bridge traffic patterns are highly variable and different from normal commuting patterns (I-190)

Average traffic and average air pollutant concentrations are not likely to provide an adequate assessment of sources

- Truck Idle-Hours Eastbound
  - Average: 29 Max-Hr: 248 90th Percentile: 79
- Auto Idle-Hours Eastbound
  - Average: 151 Max-Hr: 1413 90th Percentile: 410

1-Hour vehicle data can be correlated with air pollutant concentrations and Wind Speed and Wind Direction data

1-Hour data allows for analysis of episodes (traffic & air quality)

- High: Holiday Weekend Low: Snow storm

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Neighborhood Data Collection

(PTRAK): 10/23, 11/5, 11/9, 11/16, & 11/20

Thank You

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