HW #4: Analyze real-world emissions data

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2022-11-18

1

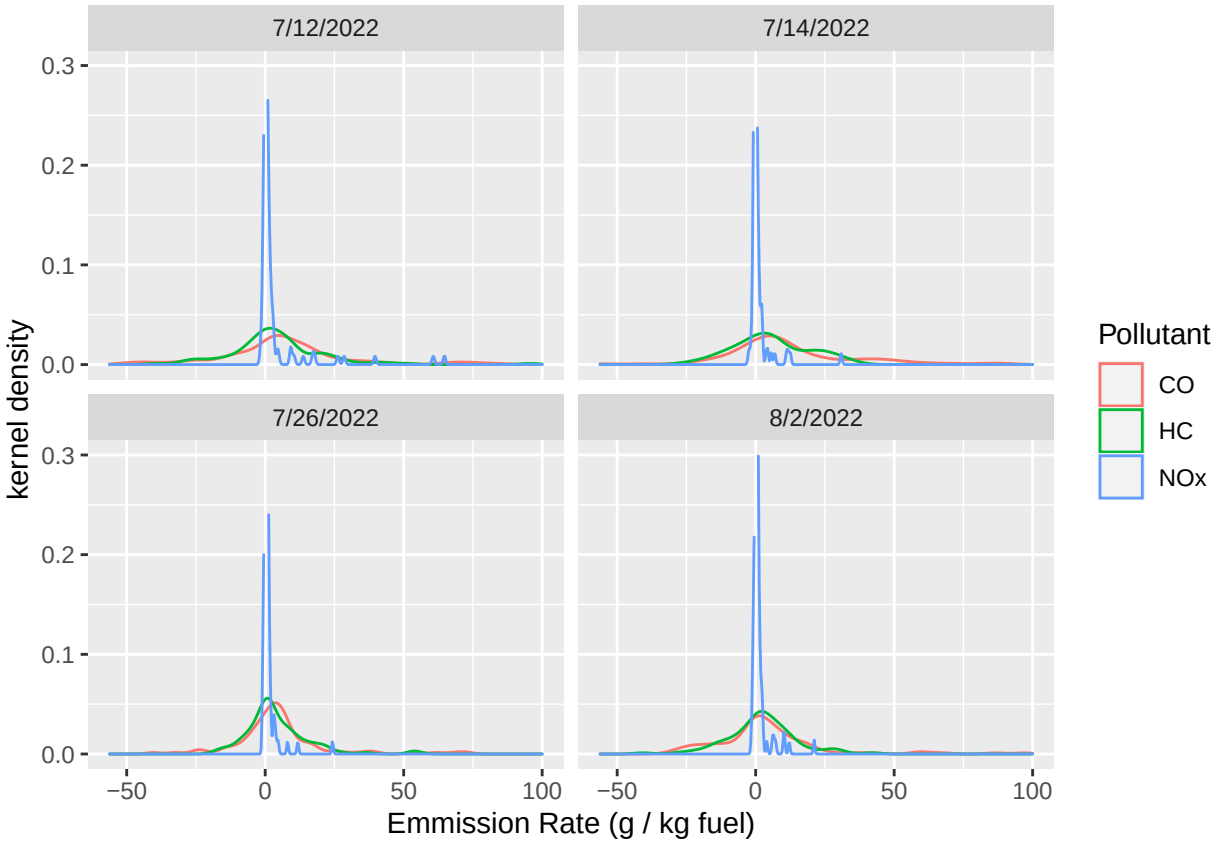


Figure 1: Emissions density by date.

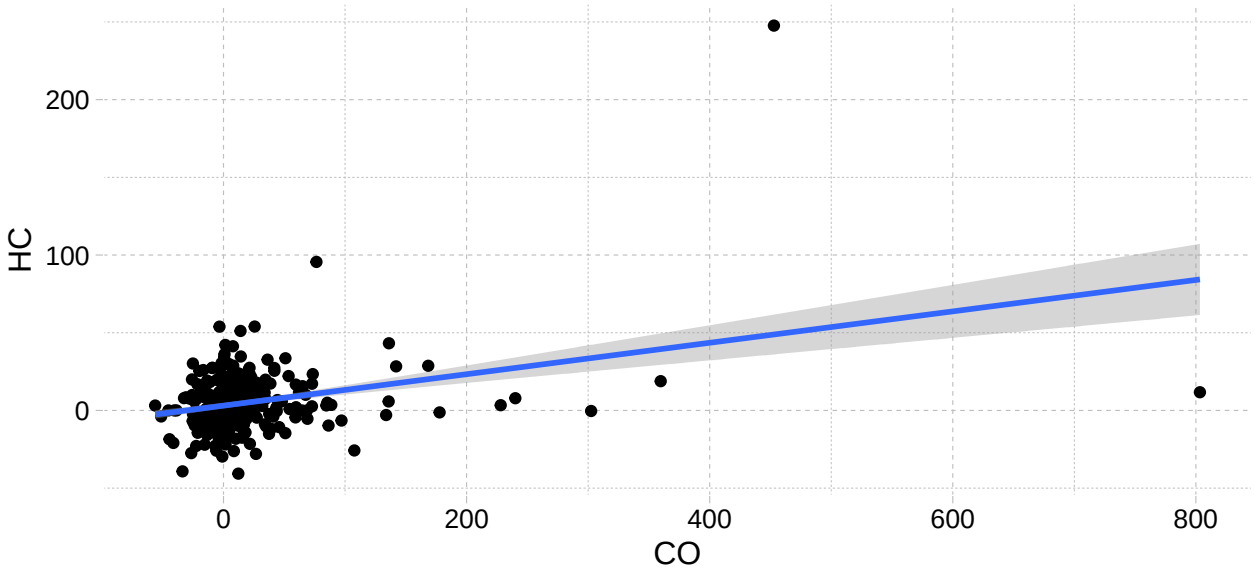
1.1

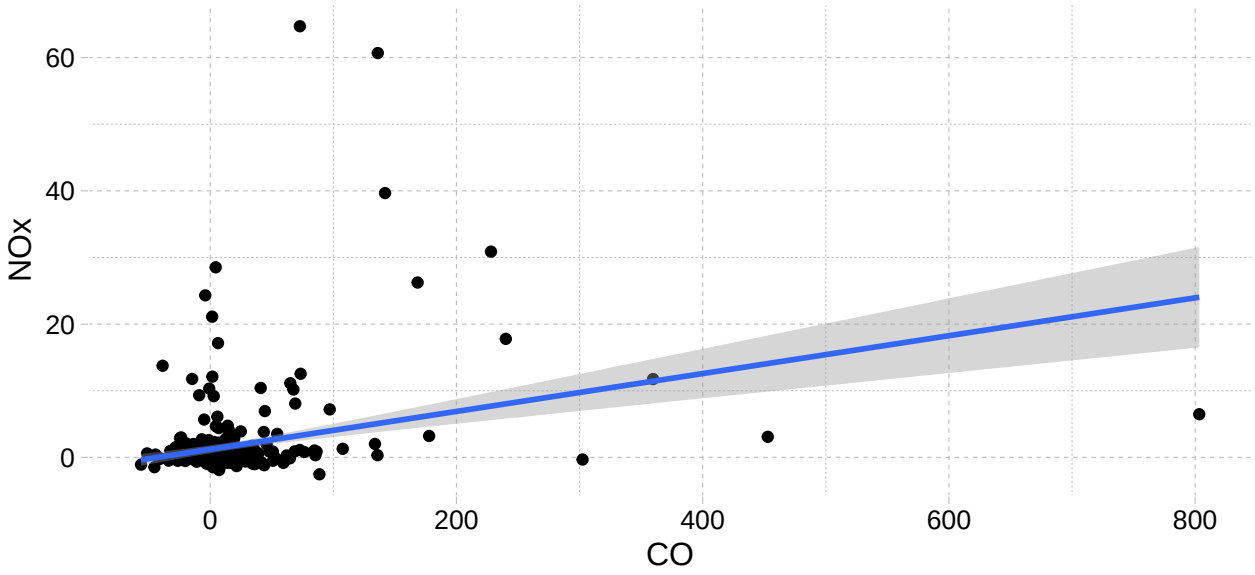
location	pollutant	max_emisions	median_emissions	max / median
Timp Hwy East	CO	177.80	3.36	52.90
Timp Hwy East	HC	53.99	1.62	33.31
Timp Hwy East	NOx	24.31	0.50	48.38
Timp Hwy West	CO	803.31	1.59	504.24
Timp Hwy West	HC	42.14	1.89	22.25
Timp Hwy West	NOx	21.11	0.42	49.83
Univ Ave	CO	452.85	7.19	63.00
Univ Ave	HC	247.66	3.18	77.96
Univ Ave	NOx	64.70	0.25	259.12

1.2

Looking at Figure 1, NOx appears to have quite a skewed distribution, though CO has a few extreme outliers.

2





term	estimate	std.error	statistic	p.value
(Intercept)	6.74	2.91	2.32	0.021
NOx	2.46	0.46	5.38	0.000
HC	0.96	0.15	6.44	0.000

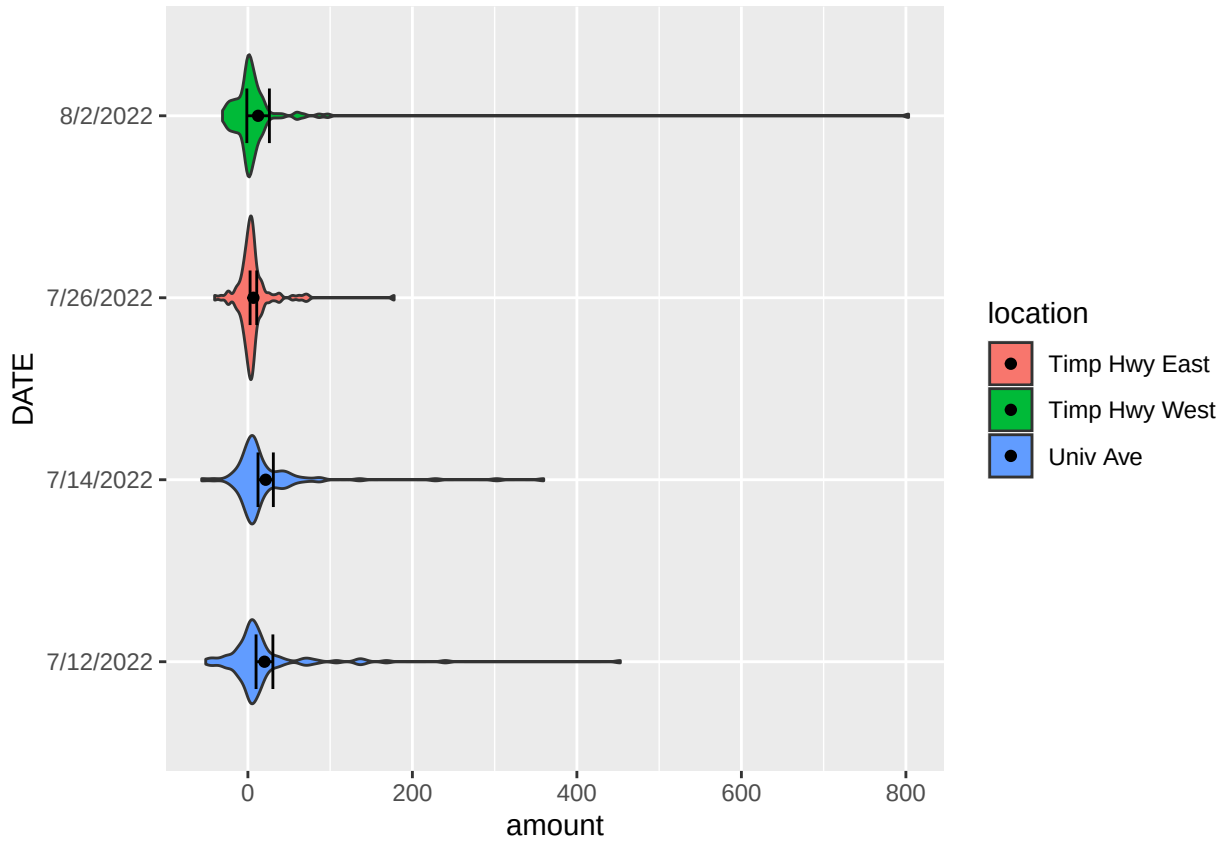
$R^2 = 0.162$

While it appears that vehicles with more CO emissions also have more NOx and HC emissions (both of these slopes/coefficients are positive), the R^2 value is quite low. There could be many other factors explaining the variance in emission rates.

3

4

```
## # A tibble: 4 x 5
## # Groups:   DATE, location [4]
##   DATE      location       mean lwr.ci upr.ci
##   <chr>     <chr>         <dbl>  <dbl>  <dbl>
## 1 7/12/2022 Univ Ave      20.2    9.93   30.4
## 2 7/14/2022 Univ Ave      21.6   12.3    30.9
## 3 7/26/2022 Timp Hwy East  6.71   2.66   10.7
## 4 8/2/2022  Timp Hwy West 12.4   -1.29   26.1
```


8/2/2022
7/26/2022
7/14/2022
7/12/2022
DATE
0
200
400
600
800
amount
location
Timp Hwy East
Timp Hwy West
Univ Ave