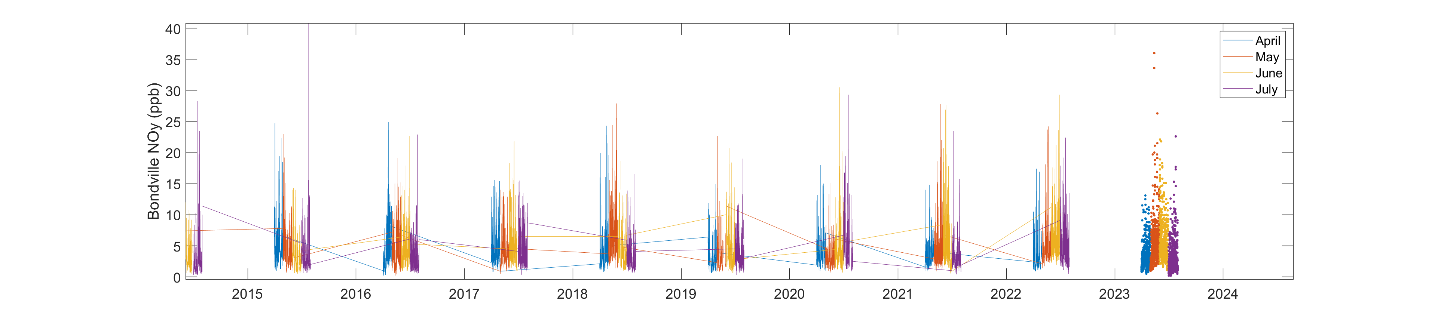
There’s some very interesting trends in NOy baseline (and peaks) from year to year at bondville by month. There’s some potential role for an offset error I the measurement, but I’m more prone to thing that it is just a large buildup of NOy due to advection patterns (or lack thereof).



Lance noted that 2018 had a similar late spring to 2023, but not as pronounced. Looking at the data (slide 4), it appears that May started out in 2018 similar to 2023, but then July fizzled a bit more. In 2022, the ramp was delayed a bit.

At least CASTNET reports their daily calibration results so we can investigate potential sources of error.

In late May, there was a lot of smoke from Western CA wildfires, but I can’t see too much of a direct influence on surface compounds.



Assuming NOy measured at Bondville for the very selective hours is aged (no NOx remaining), the relationship of ozone to NOy points to a pretty reasonable ozone production efficiency. Since NOy trends are not generally decreasing at this site, it may be reasonable to think that the source is not yet well controlled.

Chart, scatter chart

Description automatically generated

So you are suggesting that O3/NOY ratios at Bondville suggest O3 production is happening there and the O3 is not totally from regional sources? The castnet oxidized nitrogen measurements tend to peak during the typical late spring/early summer period suggesting there is a NOX source in the region that tends to emit in late spring and early summer which supports the O3 production measurements on the hottest days.

If I am interpreting that correctly, would we see similar trends over the week of the year at other castnet sites in the upper midwest?

I’m not totally interpreting it as that but rather than there does appear to be a relationship of O3 to NOy beyond what we might expect for hemispheric scale background O3. The trend does suggest that NOy is connected to temperature. It could be that temperature is linked to local emissions but it could also be that it is linked to transport patterns.

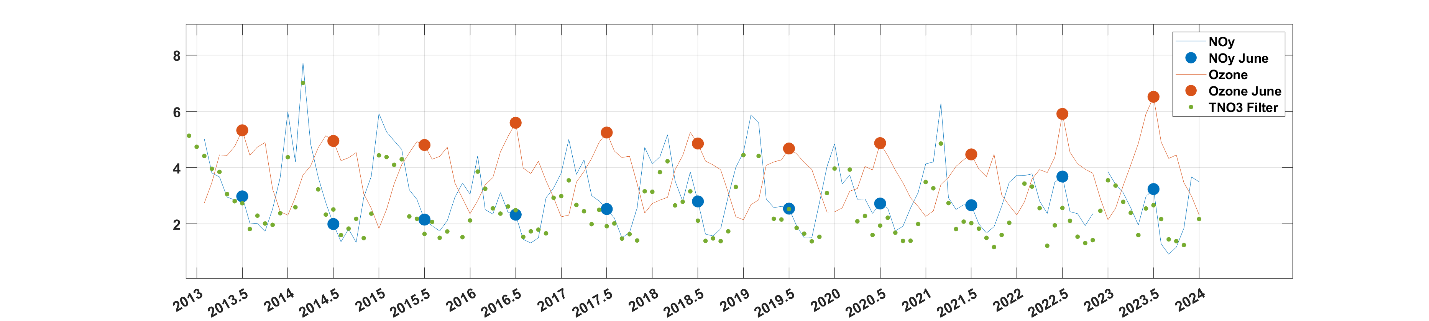
It would also seem to suggest that the lower limit, the line’s slope or delta O3 vs delta NOy,  for OPE ( estimated as delta O3 vs delta (NOy – NOx) ) is quite high, such that reductions in NOx should be quite efficient towards reducing O3. However, trends of NOy suggest that a source that has yet to be controlled is the predominant source affecting this region, at least from 2013 onward.

On off chance that this heat was associated with ozone, I took a look at the last several days in the midwest. There were broad values in the 60s and some 70s and even a few 80ppb. I wonder if this monitor NW of Kansas City exceeded yesterday. There was some fires in the hills, but it doesn’t actually look like that day’s smoke transported to Kansas City based on the winds and TEMPO data.

The TEMPO data has issues in the early morning and late day, so don’t take some of the signals too seriously. They also don’t cloud clear too well yet. But with the  winds, TEMPO and surface O3 data, you can kind of get a sense that the KC plume advected NW early on Sunday 4/14 and then kind of just sat there.

The last two June’s have been off the charts for ozone (monthly 1400-1700 LST average) and a bit off charts for NOy (same time period). Interestingly there is a pretty good temporal correlation between NOy afternoon averages and the total nitrate (gas HNO3 + particle NO3) integrated filterpacks samples, monthly averaged by end dates (green).

I divided ozone (ppb) by 10 to fit on the same scale as TNO3 (micrograms/m3) and NOy (ppb).



Just weird there isn't ozone with the seeming fire hits in the later summer.

