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Air Quality Facts

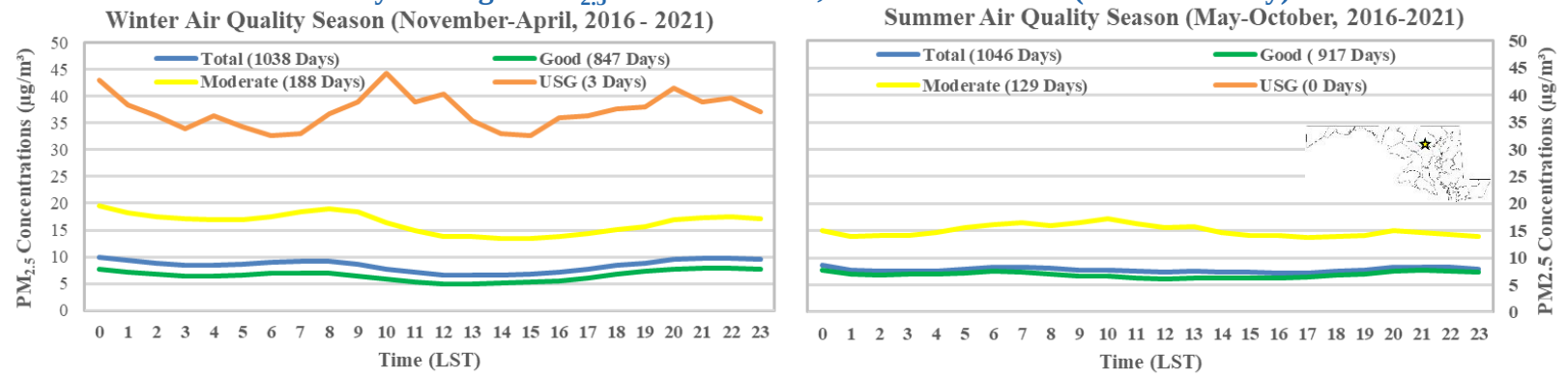
FINE PARTICLE – DIRUNAL CLIMATOLOGY

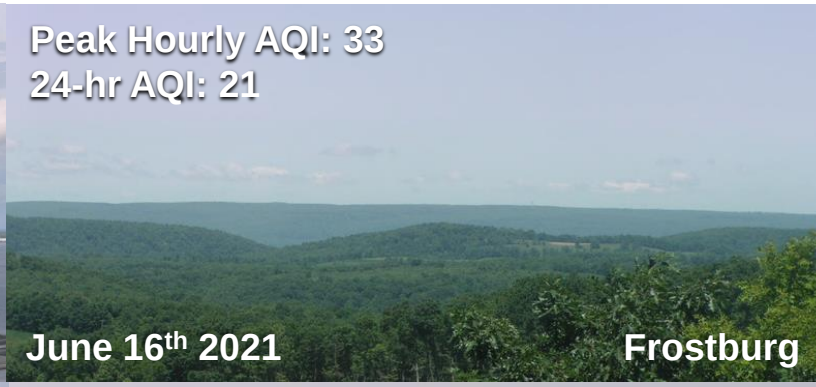
WHEN IS FINE PARTICLE ($PM_{2.5}$) POLLUTION THE WORST DURING THE DAY?

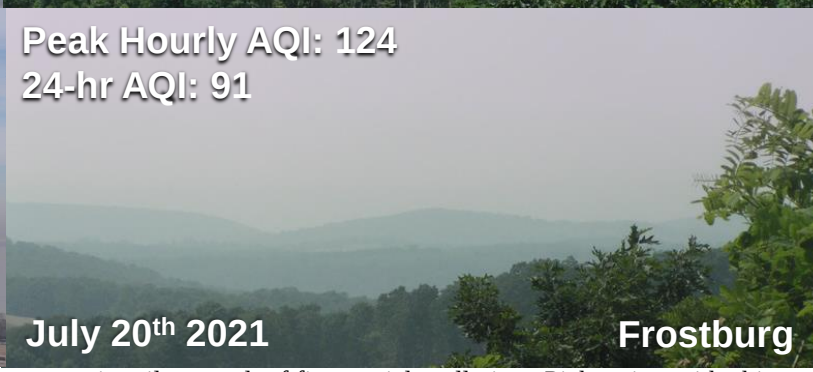
In Maryland fine particle pollution has a slight diurnal cycle with peaks occurring during the morning (6 am -10 am) and just after sunset (8 pm – 12 am) with lower concentrations during the afternoon hours (12 pm – 6 pm). The fine particle diurnal cycle follows meteorological patterns and human activity. Emissions from local mobile sources (in addition to regional/transported fine particle pollution) during the morning and afternoon rush hours is balanced by atmospheric mixing. Weaker vertical mixing overnight and into the morning keeps surface fine particle pollution at greater concentrations. This weaker mixing can enhance surface concentrations due to mobile emissions during the morning commute, leading to a peak around 8 am, before mixing improves. During the day (12 pm – 6 pm), fine particle concentrations are lower due to stronger atmospheric mixing, which leads to dilution of surface fine particle pollution. Once the sun sets, vertical mixing shuts down, and surface concentrations increase.

The winter season has slightly higher concentrations and more pronounced diurnal features compared to the summer season. This occurs because winter-time concentrations are driven by local sources and weaker vertical mixing, while the summer-time concentrations tend to be dominated by regional influences and strong vertical mixing. For all seasons, after an increase in fine particle pollution around sunset, overnight concentrations decrease to a local minimum just before sunrise due to two primary reasons: (a) the removal of fine particles from the air through a process called dry deposition (fine particles settle on surfaces); and (b) minimal direct emissions of fine particles from local sources, prior to the morning commute.

Hourly Averaged $PM_{2.5}$ Concentrations, Oldtown Monitor (Baltimore City)







A look outside can tell you a lot about the state of air quality! Hazy conditions are primarily a result of fine particle pollution. Pick a vista with objects known to be at least 7 miles away and see whether they are visible. The rule of thumb is greater visibility equates to better air quality. If the vista is less clear or obscured by haze, then the outside air is likely to be polluted. Protect your health by knowing the current air quality conditions and forecasts: see MDE's air quality forecast or visit Airnow.

Air Quality Index (AQI)

0-50 Good	51-100 Moderate	101-150 USG*	151-200 Unhealthy	201-300 Very Unhealthy	301-500 Hazardous

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