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Comment

Interactive comment on “Trends in concentrations of atmospheric gaseous and particulate species in rural eastern Tennessee as related to primary emissions reductions” by R. L. Tanner et al.

R. L. Tanner et al.

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Comment 1: The authors have to explicitly discuss to what extent they achieve their objectives

Response: Agreed. We set forth three objectives in the introduction. As stated, we identified significant trends in pollutant precursor emissions and primary and secondary air pollutant levels. Emissions of SO₂ and NO_x all decreased greatly during the time period of the analysis. This finding leads to the second objective in that we were able to statistically correlate the emissions and pollutant changes—SO₂ emissions and ambient

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SO₂ and sulfate particle levels were strongly associated. So, too, were NO_x emissions and ozone levels. Strong associations were also found between NO_x emissions and organic particle levels. Finally, the third objective was to identify the degree to which trends in meteorology contributed to observed trends in ambient pollutant levels. The only notable trend in meteorology was in wind speed and the potential link between speed and pollutant concentrations (by way of a change in the emission region of maximum influence on Look Rock air quality) was discussed.

Comment 2: It would be good to add the information of the elevation in the figure. Is Look Rock the only monitor in the domain?

Response: The Look Rock elevation is 805 m. The paper mentions the height of 815 m but this refers to the inlet height at which ambient air was sampled (i.e., 10 m above the ground). The elevation information is easily added to the figure (revision attached). Look Rock is the only trends station in the illustrated domain. Other air monitors exist but have not operated anywhere near as long, they are focused on air quality in urban areas where local sources tend to dominate, and none possess the complete set of measurements made at Look Rock.

Comment 3: I do not think how the diurnal trend analysis will be unnecessary since annual and seasonal trends are more relevant to the environmental policy and pollution reduction.

Response: I believe the comment meant to say "necessary" rather than "unnecessary". The reason for including the section on diurnal patterns is that they are unique due to the elevation of the site and they can (if they change) impact interannual trends because daily averages might change simply due to changes in local conditions/diurnal patterns. As it is, there really were no changes in Look Rock diurnal pollutant patterns. For this reason, section 3.5 could easily be deleted or moved to the Supplement and a statement be added indicating that there were no clear changes in diurnal pollutant patterns that may have influenced long-term air pollutant trends.

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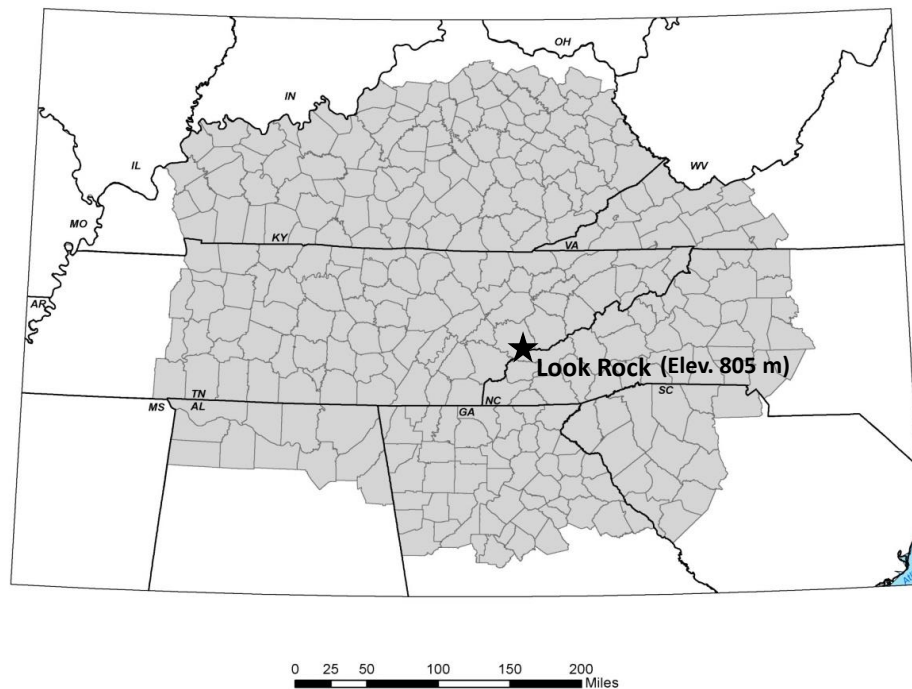
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Fig. 1. Spatial domain used to compare trends in air quality with trends in emissions of precursor species. Star indicates Look Rock location in east Tennessee near the North Carolina border.

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