General comments:

Seo et al. present an evaluation of trends at various frequencies in Seoul, Korea. They use meteorological detrending techniques that apply the KZ filter and multiple linear regressions along with a simplified continuity formulation to attribute long term changes to local and transported sources.

Overall, the analysis is vigorous, and the conclusions appear relevant to future policy decisions. Other than a deeper discussion of the continuity approach and the minor suggestions below, I believe the overall analysis to be sound and an important contribution to the published literature.

Specific comments:

The meteorological detrending approach has been applied in similar fashion in previous applications, but I believe the continuity-based derivation of local/transported emissions on the long-term trend to be innovative. My major comments for this manuscript revolve around the development and discussion of this approach—I have listed questions here that I hope will inspire the authors to consider and discuss the approach in more detail. While the interpretation of the results appears to fit within scientific understanding of current atmospheric processes and emissions trends, I think the manuscript would be greatly improved by further development of this method.

1. Please clarify that local/long term transported emissions to long-term trends only are available to Seoul-wide data, not on individual sites. What are the implications of the distance scales, numbers of monitors available, and the choice of centering the cartesian coordinates at the weather station? As the distance scale used here is on the order 10^1 km, can we assume the origin of the transported pollutants to be a certain distance away (e.g., on the order of 10^2 km)?
2. What is the interpretation of the high nonlinearities in the meridional gradients (Figure S5)?
3. Are the meridional slopes generally statistically significantly different from zero?
4. Are there limitations to this approach in regard to fewer available monitoring locations, spatial distributions of monitoring sites, etc.? High levels of missing data on certain days could severely impact calculated meridional slopes. Did the authors find evidence of this? If so, was anything done to correct for it?

Technical comments:

Page 4, line 9: How were Asian Dust days identified?

Throughout the manuscript (and especially in the Data section), please clarify the monitoring station being referred to, or whether the data is an average of all monitoring stations.

Eqns. 2 & 4: I recommend changing the syntax of these equations slightly to improve clarification. The current form of, e.g., $KZ_{(m,p)}X(t)$ looks like the KZ term is being multiplied by X(t). I recommend changing to $KZ_{(m,p)}[X(t)]$ or similar

Eqns. 10 & 11: Please include section (possibly in the supplement) with more detailed derivation steps.

Page 8, Line 15: I believe there is a typo in this sentence. Possibly it should be "…not balanced *against* each other in *the* short-term timescale"

Page 8, Section 4: Please provide explanation for why the variances described by each of the trends do not sum to 100%.

Page 9, line 22, suggest remove final word ("were")

Page 12, Line 9: Why do you use $p<0.1$ here, and 0.05 elsewhere?

Page 12, Line 29: I advise referencing the relevant emissions changes in Figure 7 to more fully describe impacts potential impacts of the Legislation

Table 4: Relatively higher (positive or negative) correlation between some met variable ST trends (SI and RH, for example) may affect the interpretation of

Figure S3: Please clarify which monitoring site this data is from, or if it is an average. This clarification should be made throughout the manuscript

Figure S4: I recommend stating that the gray line in each subfigure represents the raw spectrum.