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Interactive comment on "Effects of meteorology and emissions on urban air quality: a quantitative statistical approach to long-term records (1999–2016) in Seoul, South Korea" *by* Jihoon Seo et al.

Anonymous Referee #2

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In the manuscript, the authors used various statistical tools such as the K-Z filter and multiple linear regression method to the 18 year long-term data of the criteria air pollutants and meteorological variables. They could separate short term variations and long-term variation. Further, out of the long-term trend, they could separate the meteorological and emission driven trends. In addition they calculated local emission driven and transported components from the emission driven part based on the continuity equation approach.

It is a well organized manuscript and the results are of great importance since this

study result can be complementary to the 3-dimensional chemical transport modeling results and, thus, it can provide a scientific background for effective policy development in South Korea.

However, there are several points that should be improved and clarified. Thus, I recommend the manuscript be accepted for the publication in the Journal with minor revisions. Specific points are:

1. Abstract needs revision to further emphasize the scientific significances of the study. 2. It would make the manuscript more valuable to compare the results with other the study results for South Korea in which the same statistical tools have been used (for example, Shin et al., AAQR, 12, 93, 2012). Also, it would be nice to refer and compare the study results on the influence of meteorological parameters on the air pollutant level (for example, Lim et al., JKOSAE, 28, 325, 2012). 3. In table 1, add a part on explaining why the sum of the variances is not 100%. Also, in table 4, it would better to make the sum of the trends of 'emis' and 'met' be equal to the total. 4. In eq. (9), should it be a residual term or SLT contains all terms except advection? 5. What would be the main reason for CO(LT,Met) and SO2(LT,Met) to show different trends though both of them are primary air pollutants? 6. The different trends of NO2 and NOx might be caused not only by the reasons explained in the manuscript but also with changing oxidative potential of the atmosphere (for example, Kim and Lee, AAQR, in press).