Reply to Reviewer 2:

Thank you very much for your comments for making this presentation better. (All the revisions appear in blue in the revised PDF.)

1. Potential spatial inhomogeneities.

   The reviewer made an excellent point on the potential spatial inhomogeneities on both CWT and DFA spectra. One of the interesting facts is that over the island of Taiwan, the intensity of different air pollutants varies from locations to locations. They are urban and rural, coastal and inland, low-land and mountain, and industrial and agricultural regions. One would expect some dependence on the intensity of chemical species. Some basic statistical measures may be able to distinguish the differences in intensity among them. Both mean and standard deviation of the time series are selected to represent such differences in intensities. Then one would naturally expect, at least, some differences in the spectra with respective to these measures. Interestingly enough, it seems such inhomogeneities do not affect the spectral exponents very much in terms of means and standard deviations, except some weak dependence of CO and PM_{10} (see Section 3.4).

2. Natural/Anthropogenic contributions.

   Emissions, chemical reactions, and meteorological circulations all control the presence and intensity of the chemical species in the atmosphere. Control strategies of anthropogenic species are a much larger issue than the purpose of this contribution. The reviewer's concern is very much appreciated, but is out of scope of this paper.

3. Sample size

   It is dangerous to discuss any seasonal signals with a sample size of 1 year. Thus, only the broad intraseasonal peak (period of 30 – 100 days) is briefly mentioned (see Section 3.2). We are currently trying to obtain all the available multi-year air quality data. It is also important to note that the success of the present analysis will provide an important support to argue for the multi-year data for further analysis.

4. Error analysis and parameterization

   a. Error analysis
      In the Summary, we suggest to evaluate model results using the spectral and statistical methods, as we shown in this paper for the observed. The model outputs can be easily interpolated to the measurement stations. Then we can see for how high the frequency the model spectra are consistent with the observed ones. This information is dynamical. We mentioned the non-hydrostatic/hydrostatic example in the Introduction.

   b. Parameterizations

The reviewer has raised an excellent issue on parameterization. As we all know, parameterization is a tool to represent physical/chemical processes which cannot be resolved by model resolutions. In other words, the dynamical scales and information are essential and may be critical for designing parameterizations. In this paper, we illustrate the universal spectral and PDF structures from time series of chemical species. Not only do we ask how consistent of model exponents with our observed ones, but also what the implications of these structures to possible parameterizations are. Yes, we have some ideas on parameterizations, and the reviewer is perfectly correct that "highly resolved observations (perhaps 1-minute resolution) particularly for chemical processes involved short-lived species".

5. Data precisions

   This is an important issue. Thank you for bringing it up. Please see Section 2 for a discussion.

6. Typos

   (Please let us know if the Reviewer should find additional typos, and let us know the locations in the revised PDF. Thank you.)