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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Source apportionment of black carbon aerosols from light absorption observation and source-oriented modeling: An implication in a coastal city in China" *by* Junjun Deng et al.

Anonymous Referee #3

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Review of the manuscript "Source apportionment of black carbon aerosols from light absorption observation and source-oriented modeling: An implication in a coastal city in China" by Deng et al. Black carbon (BC) aerosol has significant influence on regional air quality and climate changes. However, uncertainties of the BC radiative forcing and climate effects still exist due to lack of observational understanding on BC sources, and subsequently optical properties. This manuscript compared the source contributions of BC in a relatively clean region in China from light-absorption based observation and source-oriented CMAQ model, and analyzed their temporal variations and spatial

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Discussion paper

originations. In my opinion, the manuscript presents a good work since the studies comparing different source apportionment techniques of BC are limited, although it is of great importance. The novelty is very good and the manuscript is well organized. I believe this manuscript could be accepted for publication in ACP after my following concerns are addressed. Major comments 1. This work compares the light-absorption based method with the source-oriented CMAQ model and the agreement between the two methods seems acceptable according to the comparison. However, the model performance on BC was not mentioned. I believe it is very important to add discussion about the evaluation of the model with the BC observations to make the comparison more reliable. 2. It is important to clarify the differences of the source-oriented modeling and other methods in determining BC sources such as brute force and PSAT. 3. When separating BCbb and BCff with the light-absorption of BC, why do the authors select 470 and 950 nm? Some studies adopted other wavelength combination. I suggest the authors comparing their selection with other combination to evaluate the impacts on the source apportionment results. 4. How are babs, ff and babs, bb calculated? It's not clearly enough in the manuscript. Minor comments 1. L174: Define the abbreviation CMAQ when it appeared for the first time. 2. L310: Why the South China Sea was source of BC? 3. Some spelling/grammar mistakes should be corrected.

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