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Atmospheric Measurement Techniques Discussions

Interactive comment on "New In Situ Aerosol Hyperspectral Optical Measurements over 300–700 nm, Part 2: Extinction, Total Absorption, Water- and Methanol-soluble Absorption observed during the KORUS-OC cruise" *by* Carolyn E. Jordan et al.

Anonymous Referee #1

Received and published: 17 September 2020

General comments:

This manuscript presents valuable spectral absorption (and extinction) spectrum of aerosols covering ultraviolet (from 300 nm) measured over the ocean nearby Korean peninsula. This manuscript is generally well-written and clearly described their measurements. Hence, I recommend publication of this manuscript after considering few of my suggestions, which I believe can clarify statements and attract a broader com-

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Discussion paper

munity. As the authors stated, the spectral extinction and absorption cross-sections are affected by both particle size distribution and their physicochemical properties (shape and complex refractive indices). However, in my understanding, the spectral extinction is more weighted by particle size, whereas spectral absorption features are more affected by their chemical characteristics, which makes notable differences from Part-1 paper they submitted. In particular, unlike the extinction cross-section, spectral absorption by aerosols in the UV are known to have distinct features, which are supposed to be hard to be extrapolated from longer wavelengths. In addition, absorption by aerosols in the UV has particular importance in many reasons (e.g., Zhang et al., 2013, 2017 in their reference list and Mok et al., 2016 and references therein; https://doi.org/10.1038/srep36940), but yet suffers from lack of reliable measurements over globe. The spectral variability in the UV does appeared in their measurements (Figure 10). Therefore, I believe elaborating UV aerosol absorption, together with more discussions of UV-specific error estimations of the spectral features (e.g., out-of-band stray light of the spectrometer, and stability of light source in the UV), likely at Section 3.4, can even more emphasize the values of this study.

Specific Comments:

Abstract at lines 36-37: As I suggested in the general comments, I think it worth to note that the measurement captured detailed spectral features of the single scattering albedo of aerosols, other than describing limitations of 2nd-order polynomial fitting. But it is up to the authors weather reflect this comment or not.

This study utilizes several instruments including ion chromatography and aerosol mass spectrometry in addition to their main instruments. I think a brief table in the main script summarizing these instruments (measurement method, target, their estimated error) can help readers to easily understand the measurements.

Lines 175-177: Why the UV portion was noisy? Is it due to the relatively low level of intensity of the light source in the UV or stray light? Is there any possibility that noise

could propagated to the spectral features in the UV in Figure 10?

Line 213: Please elaborate the “error propagation”.

Lines 315-316: Do you have any explanations of ‘smoothly varying” and “spectral feature” events?

Technical Corrections:

Reference Section: The part-1 paper (Jordan et al., 2020b) supposed to be submitted to AMT.

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