Review of *egusphere-2025-5541* article Retrieval of ultra-violet aerosol absorption from radiation measurements in young wildfire plumes by Tirpitz et al submitted for publication in *Atmospheric Measurement Techniques*

In this work the authors made use of airborne actinic flux spectra taken by the Charged-coupled device Actinic Flux Spectroradiometer (CAFS) during the 2019 FIREX-AQ campaign over the NW USA. These observations were used in combination with the VLIDORT for PhotoChemistry (VPC) radiative transfer model (RTM), capable of actinic flex spectra modelling, to infer smoke absorption properties.

Their approach involves constraining the VPC model with ancillary information from FIREX-AQ measurements in combination with available relevant information on particle size distribution and vertical distribution. The core of the analysis consists of varying the RTM a-priori aerosol absorption properties so that coincident CAFS actinic flux measurements are matched by the calculations. The assumed spectral imaginary component of the refractive index required to explain the CAFS actinic flux observations, is deemed to be an accurate representation of the actual aerosol absorption properties. This inversion approach is applied to three (out of 90) fires observed during the FIREX-AQ 2019 campaign.

The authors have carried out a well-documented radiative transfer inversion exercise that yields imaginary refractive index and single scattering albedo spectra. The reported results can, in turn, be used to evaluate other measurements of aerosol absorption parameters collected using both ground based as well as satellite measurements.

This is a very important contribution. It provides valuable information on micro-physical and macro-physical properties of carbonaceous aerosols specific to the type of burning material. The paper is very well written. Results are clearly presented and the figures are for the most part adequate.

A couple of minor comments:

The three-panel figure 1 looks incomplete to this reviewer. The y-axis label in the top three-panel figure is missing, and the size of the actual figures is quite small. One can assume the y-axis title is the same as in the center figure, but it is best to directly specify it. The cartoon representation (bottom figure) seems unnecessary. The distinct spectral contrast in the UV and visible regions can be described in the text, giving up more space for a fully documented 2-panel figure 1.

My second comment, also a minor one, I about the conclusion section of the paper. I suggest removing the sub-section titles in the conclusions part of the manuscript. This section should consist of a set of interconnected paragraphs that offer a full comprehensive summary of the work presented.