RC1:

The manuscript is well-written and clearly expresses the methodology and results. I appreciated the authors efforts to provide a comprehensive product for the entire 3 years of the campaign, especially given the issues with an instrument artifact. Providing the data both on the ESPO website and in Zenodo seemed like a logical choice to increase the accessibility of the data. Researchers familiar with the data would go to the ESPO website while others may find it in Zenodo. It would be good to provide more context about the data on the Zenodo page. I would recommend linking to this manuscript in the Zenodo metadata so that researchers can learn more about the context of the data.

Response:

The preprint DOI has been linked on Zenodo.

RC2:

This manuscript provides the data from the NASA ORACLES airborne filed campains that deployed a 4STAR instrument onboard a P-3 aircarft to measure columnar optical properties of biomass burning aerosol smoke plumes over the Southeast Atlantic Ocean from 2016 to 2018. The authors well describe the wavelength selection and quality control criteria, however, I think it is better to show a period of the data or a single case for example may help the readers to better understanding the quality control or what the data is about. On the whole, this is a good manuscript that provides valuable data.

Response:

A Practical Applications subsection has been added to Line 219 discussing the use of ORACLES 4STAR data by Pistone et al. 2021, Cochrane et al. 2022, Fakoya et al. 2025, and a forthcoming publication by the coauthors.

RC3:

This manuscript presents a complete and consistent three-year dataset of 4STAR sky-scan measurements from the ORACLES 2016-2018 campaigns, addressing previous data gaps by resolving instrument artifacts and applying uniform quality control. To further enhance its quality and utility for researchers, consider expanding on the technical details behind the instrument issue resolution, particularly the scientific rationale for selecting the four specific wavelengths used for the 2017 and 2018 data, and briefly describing the applied calibration methods. Additionally, improve the clarity of the quality control (QC) criteria by providing more quantitative thresholds or logical rules, ideally complemented by illustrative examples showing the impact of QC on data, such as visualizing outlier removal. For improved data accessibility and usability, detail the specific file formats and variable naming conventions used in the archived datasets on ESPO and Zenodo. Finally, offer a quantitative summary of the dataset's

spatiotemporal coverage, including total measurement or flight hours and geographic ranges for each year, to help users quickly grasp the dataset's scale and characteristics.

Response:

The scientific rationale for the four-wavelength selection was added to Line 143. Discussion of calibration methods was added to Line 48. The QC criteria are further clarified by new Supplemental Tables 3-6. File formats have been added to Line 66, while the variable naming conventions are detailed in Supplemental Table 2. Spatiotemporal coverage is now detailed in Supplemental Table 1.

RC4:

The manuscript presents a valuable extension of the 4STAR retrievals to the ORACLES 2017 and 2018 campaigns by addressing instrument artifacts and establishing automated quality control standards. The work is well-motivated and provide important dataset for the study of biomass burning aerosols and their climate impacts. However, several areas require clarification to enhance the manuscript's scientific rigor and usability for potential data users.

1. The manuscript briefly mentions the shift from a five-wavelength to a four-wavelength set to avoid instrument artifacts but lacks a detailed theoretical discussion. The authors should clarify how the removal of 400 nm affects the inversion of aerosol's properties to help potential users better understand its quality. In addition, the authors should discuss the potential biases introduced by the 4wl set, particularly the noted slight decrease in SSA at 500 nm. Is this systematic?

2. The manuscript would benefit from a case study or example analysis showcasing how the dataset can be applied. The authors can consider include a brief case study of biomass burning event to illustrate its practical applications.

3. To enhance the dataset's accessibility, I recommend including a detailed summary table listing key metadata such as variables names, temporal and spatial coverage. This will allow users to quickly evaluate the data's applicability for their research needs.

Response:

1. A theoretical discussion regarding why 500 nm was the most affected wavelength, along with the systematic bias of the wavelength selection change was added to Line 173.

2. A Practical Applications subsection has been added to Line 219 discussing the use of ORACLES 4STAR data by Pistone et al. 2021, Cochrane et al. 2022, Fakoya et al. 2025, and a forthcoming publication by the coauthors.

3. Spatiotemporal coverage is now detailed in Supplemental Table 1, while variable naming conventions are detailed in Supplemental Table 2.