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An empirical characterization of the aerosol Ångström exponent interpolation bias using SAGE III/ISS data

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Different Aerosol Events

The paper shows the behavior of the aerosol interpolation bias (Fig. 2) and aerosol extinction coefficient (Fig. 3) with respect to Ångström exponent (AE) for all SAGE III/ISS data. To illustrate that the bias behavior is robust across different loading conditions, Fig. S1 effectively shows the same representation of data broken into select four month periods (or first two months of the mission in the case of "background" conditions) surrounding stratospheric aerosol injection events of interest. While the different events may fall within different AE ranges, they all generally adhere to the same bias behavior. Figure S2 effectively shows the same representation of data as Fig. 3 to highlight how different events produce aerosol with different elevated extinctions and AEs.

Different Wavelengths

The paper uses $756\,\mathrm{nm}$ as the demonstration wavelength, with Fig. 4 showing the final fit of the AE correction. Table 1 shows the resulting intercepts and slopes at other wavelengths, and Fig. S3 shows the filtered data and fits to said data for these other four wavelengths.

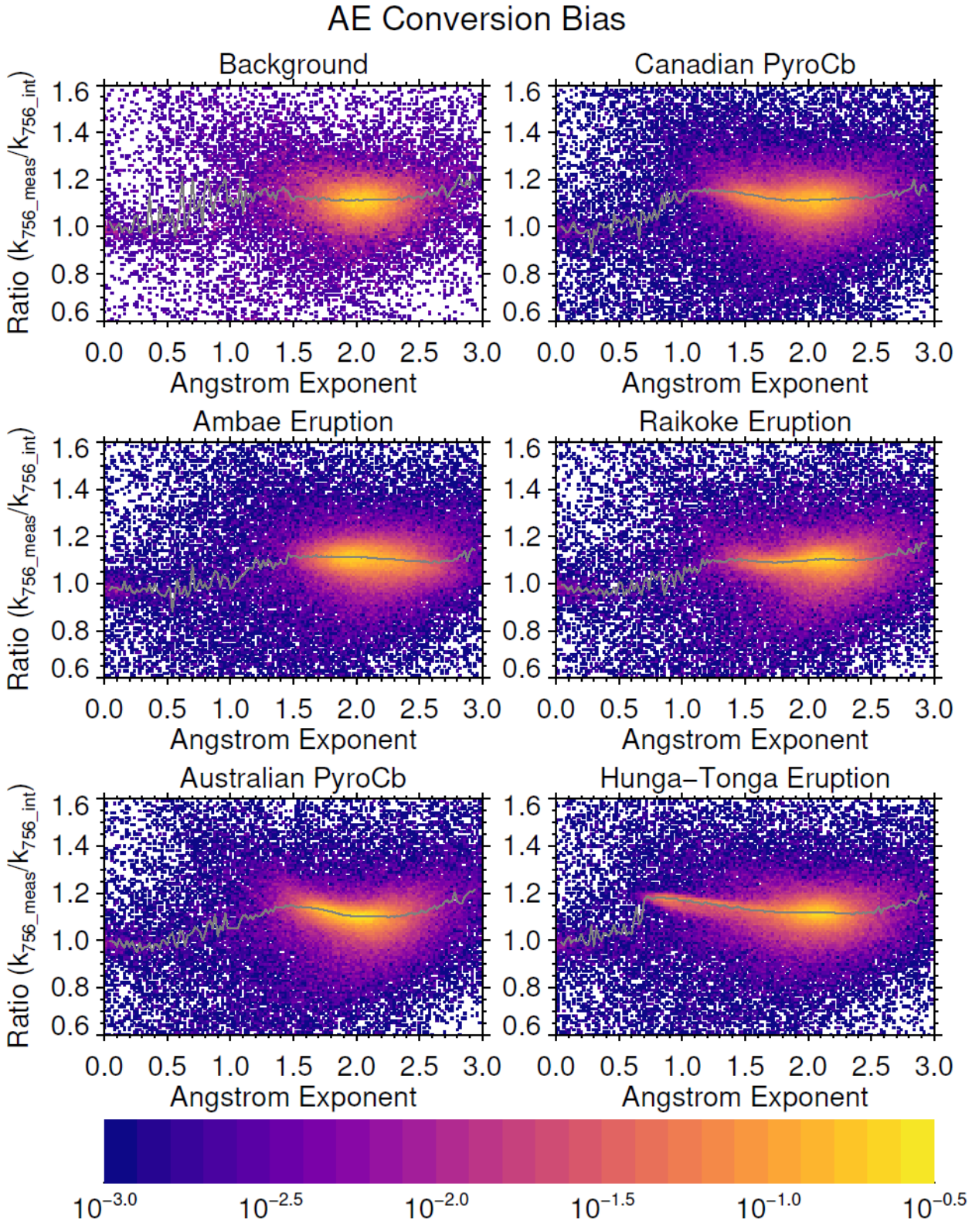

Figure S1. Histogram of the bias between the measured and interpolated aerosol at 756 nm as a function of the Ångström exponent. The histogram axis shows the fraction of all events used in each figure separately and the solid gray line illustrates a running median of the histogram. The months of data used for each panel are as follows: Background (201706–201707), Canadian PyroCb (201709–201712), Ambae Eruption (201808–201811), Raikoke Eruption (201908–201911), Australian PyroCb (202001–202004), and Hunga-Tonga Eruption (202204–202207).

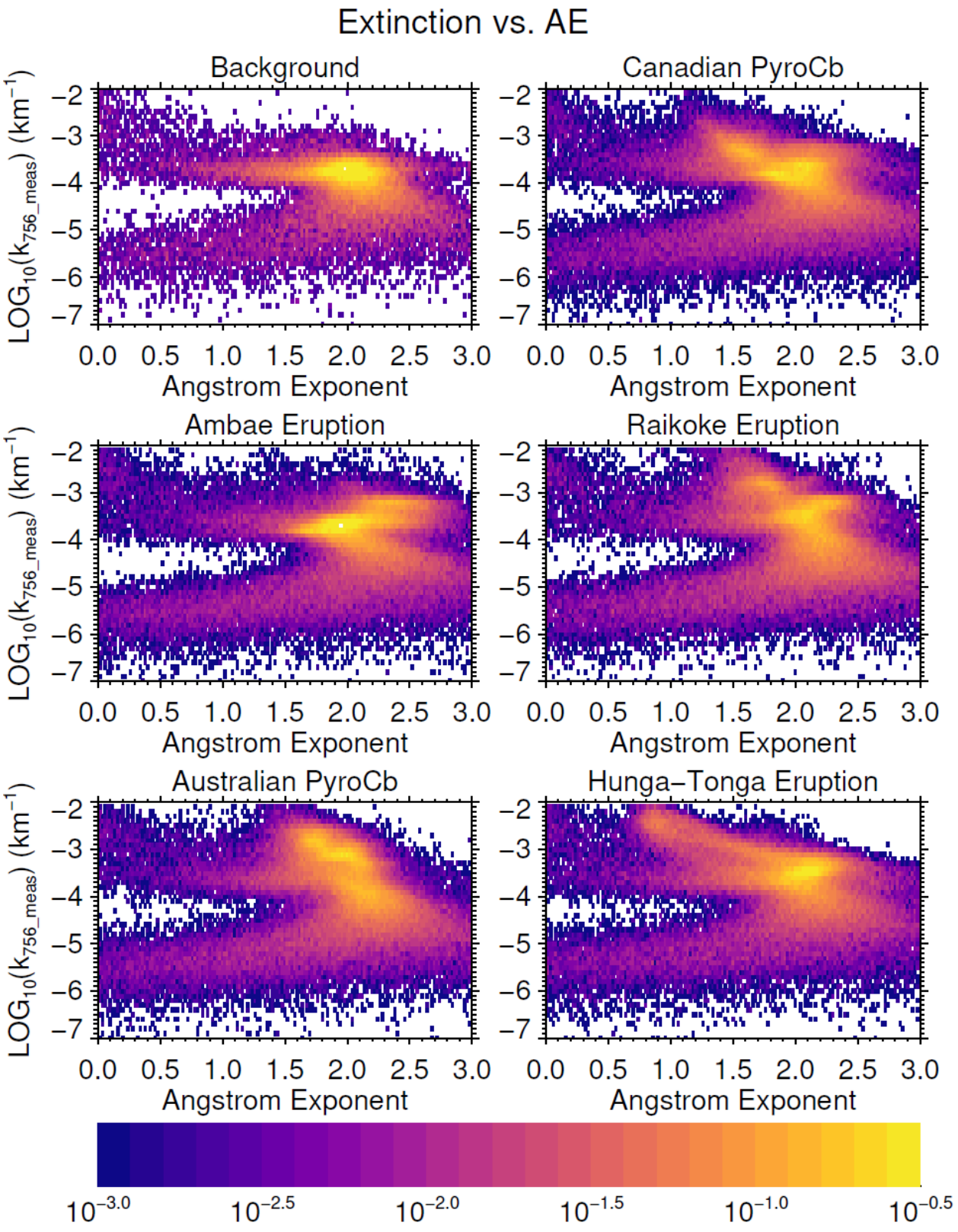

Figure S2. Histogram of the measured aerosol at 756 nm as a function of the Ångström exponent. The histogram axis shows the fraction of all events used in each figure separately. The months of data used for each panel is the same as in Fig. S1.

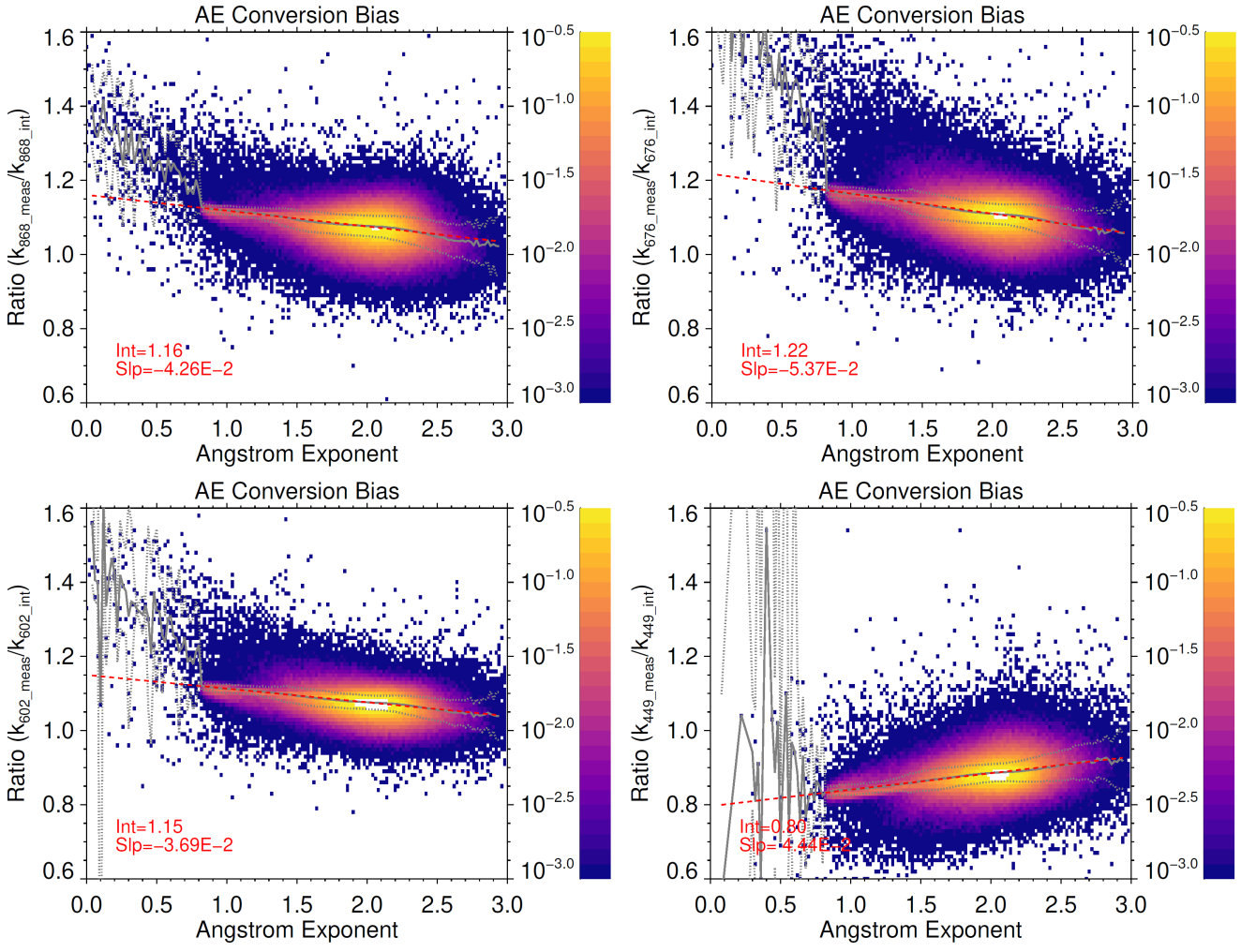

Figure S3. The same as Fig. 4 after applying the filtering described in the text but for 868, 676, 602, and 449 nm. A straight line fit of the data between $0.9 \leq AE \leq 2.2$ is shown along with the slope and intercept of the fit for each wavelength (same as in Table 1).