Ansmann et al. (2022) (hereafter A22) focus equally on Antarctic and Arctic ozone depletion and its proffered connection to stratospheric wildfire smoke. This comment offers questions/concerns with both aspects.

Regarding the Antarctic aspect of A22, the only smoke-particle information presented is from Punta Arenas. At 53°S, this location is generally on the extratropical side of the Antarctic polar vortex. Smoke observations at such a position with respect to the polar vortex interior provide no information on aerosol conditions inside the vortex edge, an effective mixing barrier according to volumes of previous research. To make a plausible link between Pinta Arenas stratospheric smoke and PSCs, the authors may need to demonstrate evidence of smoke inside the vortex, especially in the days leading up to PSC formation (typically late May). Any observation at Punta Arenas that is outside the vortex edge has no direct bearing on PSCs and PSC-related ozone depletion. It would be very interesting and important to see Punta Arenas lidar profiles segregated by their location with respect to the vortex edge. If inside-vortex aerosol enhancements consistent with the pyroCb smoke signature can be demonstrated, in air too warm for PSC support, that would immeasurably advance A22's argument.

Regarding the Arctic aspect of A22, they build on conclusions drawn by Ohneiser et al. (2021) (O21), namely that smoke polluted the Arctic stratosphere in 2019 and 2020. O21 hypothesized that smoke arrived in the stratosphere by a non-pyroCb pathway; Siberian smoke was diabatically lofted from the lower troposphere across the tropopause and continued its diabatic ascent thereafter. O21's confident determination of smoke altitude extent, based on the Polly lidar-ratio calculation, was capped at 12-13 km. A22 loosen that constrain in section 4.3.1: "Before we can deepen this discussion, we need to clarify that wildfire smoke was the dominating aerosol component throughout the entire stratospheric aerosol layer up to 18 or even 20 km height. Ohneiser et al. (2021) left the question open whether smoke or sulfate aerosol originating from the Raikoke volcanic eruption (Kloss et al., 2021) was prevailing at heights >13 km. Because of too noisy Polly lidar signals, wildfire smoke could unambiguously be identified up to 13 km height only." A22's presentation of Figures 8 an 9 appears to be an argument toward a reinterpretation of O21's smoke-altitude cap. The argument is based largely on an admittedly noisy HSRL AOD profile and a set of generated AOD curves spanning a selection of lidar ratios. Figure 9b reveals that a lidar-ratio selection of 60 would give a solution with significant HSRL-data overlap throughout the displayed z range. Prata et al., (2017) demonstrated a 532 nm lidar-ratio central tendency between 59-66 sr in an analysis of two distinct stratospheric volcanic sulfate plumes (Kasatochi and Sarychev Peak). Considering the lidar-ratio error bars in Figure 9a, Prata et al. (2017), and Mattis et al. (2010), it appears that sulfates could explain the HSRL AOD profile in Figure 9b as convincingly as smoke. Given the undisputed evidence that Raikoke sulfates were a hemispheric, high northern latitude presence in 2019 and 2020 (Kloss et al., (2021);

Gorkavyi et al. (2021); Cameron et al. (2021)), shouldn't equal weight be given to their establishment in the Arctic during MOSAiC?

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