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Interactive comment on "Ship-borne lidar measurements showing the progression of the tropical reservoir of volcanic aerosol after the June 1991 Pinatubo eruption" *by* Juan-Carlos Antuña-Marrero et al.

Anonymous Referee #1

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The authors describe a data set of lidar measurements aboard Russian research vessels over the Atlantic in 1991 and 1992. The data set could be used, e.g. for the evaluation of dispersion modelling of the Pinatubo stratospheric aerosol plume.

The data set is unique and the description is appropriate. The uploaded data sets are reasonable. I only have minor comments that might make it easier for potential users of the data set.

1. The uploaded data sets 3 and 4 (https://doi.pangaea.de/10.1594/PANGAEA.912780

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Discussion paper

and https://doi.pangaea.de/10.1594/PANGAEA.912781) should be renamed to aerosol backscatter coefficient (rather than aerosol backscattering ratio) to avoid confusion.

2. Please provide a definition of the scattering ratio.

3. It would be useful to provide a plot of the location of the measurements.

4. Please use the extinction-to-backscatter (lidar) ratio in Eq. (2). A value of 25 sr is used here, probably to agree with Advyushin et al. (1991). We now know that stratospheric aerosols from volcanic eruptions have much higher lidar ratios. For instance, Prata et al. (2017, https://doi.org/10.5194/acp-17-8599-2017) find median values around 60 sr at 532 nm while CALIPSO v4 used values between 44 sr and 70 sr (Kim et al., 2018, https://doi.org/10.5194/amt-11-6107-2018). It might be worthwhile to add a brief discussion on more recent findings to put the historic data into perspective.

5. The line marking the tropopause in Figure 1a is pink, not black. I'd also suggest to show the profiles in Figure 1 without temporal interpolation. Just as a column for each measurement time. Is it possible to unify the colour bar?

6. The discussion of Figure 3 and Table 2 (e.g. descending aerosol layer, decrease in layer top height) suggests a stationary measurement for which changes could be related to temporal evolution. What is shown here, however, includes the effect of the change in location. Please revise the discussion accordingly.

7. There is a typo in the legend to Figure 4: Heitgh. Please also provide a description of the figure in the figure caption.

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