

Author response to AMT review  
(Response to reviewers' comments)

Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/egusphere-2023-546>  
Continuous observations from horizontally pointing lidar, weather parameters, and PM2.5: a  
pre-deployment assessment for monitoring radioactive dust in Fukushima, Japan  
Nofel Lagrosas, Kosuke Okubo, Hitoshi Irie, Yutaka Matsumi, Tomoki Nakayama, Yutaka Sugita,  
Takashi Okada, and Tatsuo Shiina

Reviewer 1:

The manuscript has been improved a lot after the revisions and the critical missing link between the current analysis and radioactivity seems to be better established. Consequently, there is no need to skip the radioactive part in the title anymore. There only a few remaining technical details to be corrected prior to publication.

1) Based on the authors' replies, it seems that they are calculating and using the volume linear depolarization ratio in their analysis that corresponds to the total depolarization during scattering from a volume of air that includes both aerosols and particles. Please stick to the official nomenclature and use the term volume linear depolarization (VLDR) in the manuscript instead of just linear depolarization ratio.

**Response:**

The authors have specifically stated that the depolarization ratio presented in the manuscript is the linear volume depolarization ratio (L. 105-106). The authors have also included 3 references (Freudenthaler et al., 2009; Comerón et al., 2018).

2) The authors must also be careful when comparing their measured VLDR with values from the literature. The values found in the lidar literature correspond to the particle (aerosol) linear depolarization ratio (PLDR), that is the depolarization ratio after removing the influence of the molecules.

The authors must mention this in the manuscript, when they are directly comparing values with the literature. They must also keep in mind that the PLDR is generally larger than the VLDR because the molecular lin. dep. ratio is small ( $\sim 0.004$  at 355 with an IF  $\sim 0.5\text{nm}$ ). Aerosol dominant scenes correspond to VLDR values closer to PLDR.

**Response:**

The authors have checked the references that were presented in the manuscript and have emphasized the type of depolarization ratio presented in their results (L. 150-154).

3) Please also provide a reference and/or a short description that explains the polarization calibration process.

**Response:**

The authors have already provided the references on the polarization calibration process in the manuscript (Burton et al., 2015 and Xu et al., 2022). The authors added the statement "The gain is obtained by measuring the signals from each channel when the polarizer is oriented at the parallel and perpendicular positions." (L. 108-109)

4) Please have a look at the pdf attachment that contains some suggestions for better phrasings

Response:

The authors couldn't find the pdf attachments. However, the authors believe that the reviewer is referring to the comments after comment #6.

5) In section 3.3, Skynet is mentioned. Is this a PredePom Instrument. Please mention whether the instrument is a sunphotometer or an in-situ instrument like a particle counter.

Response:

The authors have included the name of the instrument used by the Skynet program which is the Prede sky radiometer. The authors have added the statement "The SKYNET network uses the PREDE POM-01 and POM-02 as in-situ sky radiometers." (L 120-121)

6) Table1: Beam divergence: Please specify whether this is the beam divergence prior to expansion and also specify more details.

Is it the half or full angle beam divergence? Which part of the laser beam does it encircle e.g. 2 sigma (87%) or at 3 sigma (99%)

Response:

The beam divergence is the full angle divergence before expansion. This information can be obtained from the Spectra Physics website (<https://www.spectra-physics.com/en/f/explorer-one-compact-laser>). The authors have added the phrase "with a full beam divergence of 3 mrad prior to expansion". (L. 93-94)

Typos and rephrasing:

Response: The authors thanks the reviewer for noticing these typographical errors and for recommending better phrasing. The authors have corrected these and have responded to the reviewer's comments:

L29: " that can be left alone and gather data " --> that can perform continuous and automated measurements, gathering data

Response:

Done (L. 29-30)

L35: " This possibility is the focus explored in this paper." --> Such applications are the main focus of this paper.

Response:

Done (L. 35)

L86: " in analyzing" --> when analyzing

Response:

Done (L. 86)

L104: " The linear depolarization ratio" --> "The volume linear depolarization ratio (VLDR)..."

Response:

Done

L110: " is around 74 m horizontally and 19 m" --> is install at around 79 m horizontally and at 19 m vertically?...

Response:

Done (L. 112)

L192: remove the duplicate

Response:

Done (L. 194)

L219: Remove the duplicate

Response:

Done (L. 221)

L299: Add a space

Response:

Done (L. 293-297 and L. 302)

Reviewer 2:

Please fix Line 193 "This result is expected this result is expected"

Response:

Done (L. 194)

Paragraph starting on Line 239, Please fix figure 4 references, you states 4e and f but I think you mean g & h

Response:

Thank you for noticing this. The authors have made changes as shown in L. 242-243.

Line 290 do you mean "when the average extinction coefficient is compared with wind direction" instead of wind speed?

Response:

Thank you for noticing this. The authors have made changes as shown in L. 292.