General comment

The study "MicroPulse DIAL (MPD) – a Diode-Laser-Based Lidar Architecture for Quantitative Atmospheric Profiling" by Scott M. Spuler, Matthew Hayman, Robert A. Stillwell, Joshua Carnes, Todd Bernatsky, and Kevin S. Repasky provides a thorough description of the architecture of the MDP Gen 5 Lidar.

The level of technical detail provided is simply outstanding, the interested reader and the lidar expert can find so much information in this article to satisfy their thirst of lidar engineering thoroughly.

The last part of the study dealing with the validation of the humidity data is somehow less robust and less convincing than the technical part. The comparison with the radiosounding measurements is based on very few cases and does not allow to assess quantitatively the accuracy of the MDP Gen5 data. Despite this not fully satisfactory part of the analysis (which should be improved probably in a future validation study) the scope of this paper is perfectly adapted to the requirements of AMT and the study's objectives are largely met. This study will contribute positively to the state of the art of DIAL (and in in perspective HSRL) lidar technology. I have a short list of minor comments and curiosities that could be easily addressed by the authors.

Technical comments

Abstract: the abstract results a little too generic, deprived of all quantitative results. The general reasons leading the authors to develop a diode-based to address the observational need are provided. The cost-effectiveness and the network aspect are also provided, but the information regarding the field testing and the radiosonde comparison are missing.

Abstract, ln 4: replace "based on a diode-laser-based lidar architecture" with "based on a diode-laser technology".

Introduction: it gives the context in which the authors decide to develop an active remote sensing technology capable for deployment in a network of instruments at the national scale, but the provided structure of the study, nor its scope are provided clearly.

Sect.1.1, Pg 3, ln 63-65: while it is technically true that by calibration against radiosounding, a possible systematic error in the reference becomes almost undetected, the radiosounding suffer typically an uncertainty of 0.1 K and 1%-RH in the troposphere, which is almost negligible when compared to the typical uncertainty of a DIAL or HSRL.

Sect.2, Pg 6, ln. 140-142: could you provide a percentage value generally speaking for the needed power of single-frequency laser diodes compared to narrow-band solid-state lasers?.

Sect.2.3, Pg 10, ln. 218: which etalon? Not sure what are we talking about here.

Sect. 3.3, pg 17, ln 329-335: the double filtering provides indeed an excellent narrow band, 50 pm is quite an achievement. The first stage is housed in a temperature-controlled mount (what is the precision of the controlled temperature), what about the second stage? why there is no temperature control on the Alluxa interference filter?

Sect. 4 pg 22, ln 468-476: before removing the background why is not performed a dead-time correction? Is the detection unit of the Gen 5 MPD following the non-paralyzable hypothesis? In any case (data corrected or not) it would be useful to add this information.

Sect. 5.1: the overall comparison between the Gen4 and Gen5 datasets is hardly mean-

ingful. The Gen4 comparison dataset is made of up to 60 RS41-MDP Gen4 cases, while the RS41-MP Gen5 counts a maximum of 10 cases. Moreover, the 2019 comparison spanned across Spring and Summer, while the 2020 comparison is limited to the Winter. I agree on the concept, "better than nothing", but this validation is not at the level of the rest of the manuscript. It is merely a qualitative information about the better performances of MDP Gen5 compared to Gen4. I do not see the real advantage in putting Fig. B1 in the Appendix B, this figure brings at least a visual comparison of each profile. I would suggest to include it directly in section 5.1 after Fig. 17.