We thank the reviewer for the careful work. We are happy that he/she agrees to our concept of providing many technical details. In the following, we reply to the individual comments (in blue).

This manuscript described the Rayleigh-Mie-Raman (RMR) lidar system at the The Leibniz Institute of Atmospheric Physics (IAP) in Kuhlungsborn, Germany that is one of research groups having much of the lidar measurement know-how.

As mentioned in the Introduction, the importance of lidar measurements, which can observe temperature and wind speed in the middle atmosphere with high time and height resolution, is widely accepted. However, there are not many sites in the world that have such lidar facilities because of the complexity of the system configuration and operation. This paper presents the design concept of the RMR lidar system, an overview and detailed description of each component, and the arrangement of the optical elements. Each component itself may not necessarily be new technology, but the detailed information of where, why, and how it was incorporated into the lidar system is very important when a lidar system is built. This paper is a valuable insight for the lidar research community as well as for newcomers to it. The data analysis will be described in a companion paper, so there is no need to go into detail in this paper, but it would be nice to have more information on data quality for the example observations. So, I would recommend it for acceptance after the minor points listed below are addressed.

(Minor comments)

- In each section, abstract, summary and others, it is better to use same words for your lidar system.
    - a vertically emitting, daylight-capable temperature lidar (called 'RMR2' here)
    - a two-beam tiltable system intended for wind and temperature measurements (called 'RMR3' here)
    - "3-beam Doppler-Rayleigh wind lidar system" and "vertically pointing daylight-capable Rayleigh-Mie-Raman (RMR) temperature lidar with a 2-beam, nighttime only RMR wind-temperature lidar" are used in abstract.
    - "Doppler RMR lidar" is used in summary.

  We apologize for confusion with the naming of our lidar systems. We will unify the wording and use the term "RMR temperature lidar (RMR-T)" for the older system and "RMR wind-temperature lidar (RMR-WT)" for the new system that is described here. Terms *RMR2* and *RMR3* will be replaced by the more descriptive *RMR-T* and *RMR-WT* in text and figures. Number of beams and daylight-capabilities will only be mentioned if useful. The term "Doppler RMR lidar" will still be used wherever this general type of lidar is meant.

- (Line 35) Check "between 30 and 80 km" and remove "(?)".

  We will correct the reference to Rüfenacht et al., AMT, 2012.

- Add power consumption of laser in Table A1.

  We will add "power supply: 3 kW".

- (Fig.10) I would like to recommend you that a typical data is shown as an example for this paper because Discussion of the observed phenomena is not main purport. The night on 6 Feb. 2023 might not be a good example because it was between minor warming and major warming.

  The situation in Fig. 10 is typical for winter conditions at Kühlungsborn, where the lidar is often located at the edge of the polar vortex and the spatial/temporal variability in the middle atmosphere is large. Therefore, from our point of view, this example demonstrates the need for localized measurements. We will add the following sentences at the end of the description of Fig. 10 in order to set the figure into context: *"We expect better agreement between ECMWF output and observations in the summer, when the variability in the middle atmosphere is much smaller. Nevertheless, this typical winter example demonstrates the need for local measurements of winds and temperatures for understanding of dynamics in the stratosphere and mesosphere."*

- (Line 389-390) Mention the measurement errors of temperature and wind speeds, too. Comparison of error and standard deviation is necessary when the natural geophysical variability over the measurement period is discussed.

  We will add the following sentences: "*The statistical uncertainty of the temperature profile depends on the photon count rate and is omitted here for clarity of the figure. The uncertainty of the nightly mean temperature profile is ~0.2% at 40 km and 4 % at 70 km (41 m resolution). Calculations of wind uncertainties have to include not only the photon statistics, but also the gradients in the calibration matrix at the particular wind speed and temperature, and the spectral distribution of laser pulses (cf. Hildebrand, 2014). As a rough estimate, we get ~0.7 m/s at 40 km and 6 m/s at 70 km altitude (nightly mean, 41 m resolution). A detailed error description will be provided in the companion paper."*

- (Line 423) "~since October 2021", to when? If it is November 2023, "159 nights" are approximately 20% of 26 months. Is the weather condition only reason of no observation in 80% of nights?

  We had some technical issues in the first winter, but the observations are mainly limited by weather conditions since spring 2022. In the revised version, we will state that the number of nights is calculated until **.

We like to note that we will clarify the filtering method in the description of Fig. 10. A Gaussian filter is applied with the numbers describing the full width at half maximum. This applies also to the last sentence in the caption of Fig. 10.