

Responses to Review #1

The authors would like to thank the reviewer for his valuable comments which helped improving the quality of the manuscript. Our point-by-point responses to the reviewer's comments appear in bold below.

Abstract:

Line 16: managed → run

The correction has been made.

Line 17: These three lidars

The word "three" has been added.

Line 17: towns → cities

The correction has been made.

Line 18: enabled the monitoring

The correction has been made.

Line 18: along → over

The correction has been made.

Line 20: ; with... → They had

The correction has been made. The sentence was indeed too long.

Line 20: sampling → resolution

The correction has been made.

Line 21: and they were selected

The words have been added to improve the meaning of the sentence.

Line 22: given in NETcdf format → provided

The correction has been made.

Line 22: datasets → sub-datasets

The correction has been made.

Introduction:

Line 27: Giorgi and Lionello, 2008 → Ruti et al., 2016

A more recent reference has been added.

Line 36: the western Mediterranean Sea

The word has been added.

Line 40: satellites → satellite

The correction has been made.

Line 41: They highlighted also the fact

The word has been added.

Line 44: sampling → monitoring

The correction has been made.

Line 53: to measure atmospheric water vapor profiles

The word has been added.

Line 60: Western → western

The correction has been made.

Line 63: Comment on the validation campaign

The term "validation" has been removed. In fact, the authors found that it was not correct to present the Toulouse campaign in this way. The Toulouse campaign is part of the WaLiNeAs project as a second field campaign measurement. The authors specify in the text that there was an opportunity to validate the calibration of the HORUS-2 lidar in Toulouse, but it was not the purpose of the Toulouse campaign.

Line 66: of the Raman water vapor lidar measurements

The words have been added.

Section 2:

Line 91: Raman water vapor lidar data

The words have been added.

Line 92: Thus, during WaLiNeAs ground-based water vapor Raman lidars measured

The word has been added and the correction has been made.

Line 94: the majority of the water vapor content

The words have been added.

Line 96: Water vapor lidar data

The words have been added.

Line 96: are

The correction has not been made. The lidar data were published prior to submission of the paper.

Line 113: can → may

The correction has been made.

Line 115: that runs → after passing

The correction has been made.

Line 130: managed → run

The correction has been made.

Line 142: Remark on the word “Pyrénées”

The reviewer is right. The article is written in English, for better consistency the word “Pyrénées” is therefore replaced by the word “Pyrenees”.

Line 144: Frequently, at the end of summer and autumn

The word has been added.

Line 130: Low → Lower

The correction has been made.

Line 176: AC → air-conditioning

The correction has been made.

Line 177: optical detection → the detection

The correction has been made.

Line 177: turbines produce an intense air mass flow to remove [...]

The words have been added to improve the meaning of the sentence. The authors thank the reviewer for his help.

Line 181: are presented in

The word has been added.

Line 187: Remark on the laser model

The three lasers are different. One is a Q-Smart 450 (WALI), one is a MERION-CG4 (HORUS-2) and one is an Ultra (HORUS-1). However, we think that this information is not relevant for Table 1.

Line 204: Inject → fed

The correction has been made.

Line 212: With identical overlap factors

The word has been added.

Line 214: The periods during which

The word has been added.

Line 220: of November and December, respectively

The word has been added.

Section 3:

Line 239: Raw lidar profiles are expressed in millivolts (mV) and sampled at a rate of 200 MHz referring to analog and photon counting detection, respectively

The words have been added to improve the clarity of the sentence.

Line 241: native → raw

The correction has been made.

Comment on Table 2

The laser beam expansion factors (x10 for all lidars) have been added as signal acquisition specifications.

Line 244: Typically, the lidars acquire

The word has been added and the correction has been made.

Line 250: By the parameters [...], respectively

The word has been added.

Line 252: , while [...] are

The word has been added.

Line 253: Comment on the reference Nicolet (1984)

Reference updated

Line 260: Where N_i and M_i are respectively [...] → where N_i and M_i are [...], respectively

The correction has been made.

Line 289: Error budget calculation

The word has been added.

Line 299: Where → where

The correction has been made.

Line 301: HV → high voltage (HV)

The correction has been made.

Line 302: Comment on the description of the high voltage variations

The sentence has been modified to improve the meaning of the description. Indeed, the authors wanted to say that “to avoid saturating the photomultipliers, HV vary mainly during daytime”. It is during this variation that uncertainty arises.

Section 4:

Line 336: comment on the use of above mean sea level (a.m.s.l.) instead of above ground level (a.g.l.)

The comment has been considered. All lidar profiles are plotted according the altitude a.m.s.l.

Line 348: Comment on the Figure 8

The unit $\text{g}\cdot\text{kg}^{-1}$ has been changed into $\text{g}\cdot\text{kg}^{-1}$

Line 355: H₂O and N₂ → H₂O and N₂

The correction has been made.

Line 363: Example of WVMR temporal series of vertical profiles

The words have been added.

Line 374: WVMR vertical profiles

The word has been added.

Line 375: in the atmospheric boundary layer → in the planetary boundary layer (PBL)

The correction has been made.

Line 376: It should also be noted

The word has been added.

Line 376 and 378: Comment on the references missing

References have been provided (IPCC, 2022 and Flamant et al., 2024).

Line 380: Temporal evolution of vertical profiles of the WVMR → Temporal evolution of the profiles of the WVMR

The correction has been made.

Line 386: Signal to Noise Ration → SNR

The correction has been made.

Line 388: of the returned lidar signal

The word has been added.

Line 390: of → in

The correction has been made.

Line 393: Moreover, unlike the night detection scheme, the day detection is performed in analogue mode and we must account for the statistical variation in the detector gains.

The words have been added.

Line 396: "Eq.9" removed.

Line 405: For each lidar system

The word has been added.

Line 425: lidar → lidars

The correction has been made.

Line 428: section 4.3.1 → (cf. section 4.3.1)

The correction has been made.

Line 441: Radiosonde → radiosonde

The correction has been made.

Line 443: the vertical resolution of the lidar profiles

The word has been added.

Line 450: During the first part of the lidar WaLiNeAs campaign

The word has been added.

Line 450: event → events

The correction has been made.

Section 6:

Line 512: aims → aimed

The correction has been made.

Line 513: in the lower troposphere using the Raman lidar technology

The correction has been made and the word has been added.

Line 519: during which the WVMR variability

The word has been added.

Line 519: with a single lidar system

The word has been added.

Line 523: 15 and 30 min averages provided

The correction has been made.

Line 524: is → was

The correction has been made.

Line 524: provided access to altitudes higher than 2 km a.g.l.

The correction has been made.

Line 528: allow → allowed

The correction has been made.

Line 529: atmospheric boundary layer → PBL

The correction has been made.

Line 529: Lidar derived WVMR vertical profiles also allowed

The words have been added and the correction has been made.