Public justification (visible to the public if the article is accepted and published):
Dear Authors,

Thank you very much again for submitting to AMT. I acknowledge that all requests have been fulfilled. There remain some minor corrections to be done before the manuscript can be published. I encourage you to do the changes listed below so that the document can proceed to the publication stage.

Best regards,
Christof Janssen

Dear Editor,
thank you again for your work. This really helps to improve my paper.

Note that we have added the following required missing sections at the end of the manuscript:

Author contribution

FG and DE designed the DIAL system and FG carried out the experimental set-up, the atmospheric measurements and the data analysis. CC contributes to the electronics of the lidar. DM carried out the spectroscopic measurements and brought his expertise for the spectroscopic data. CY provides the in situ data for comparison. FG prepared the manuscript with contributions from all co-authors.

Competing interests

The authors declare that they have no conflict of interest.

Acknowledments

This work benefited from the French state aid managed by the ANR under the "Investissements d'avenir" programme with the reference ANR-11-IDEX-0004 -17-EURE-0006.

The footnotes in ATC file that contain text in French could not be modified. There are linked to the French version of Word.

l17 "with an additional Doppler ability". This information reads a little bit like science slang. Maybe you could just delete it from the abstract or find a more appropriate phrasing.
Deleted. New sentence is « It also provides the radial wind speed along the line of sight of the laser."
l132 taken in -> taken from

Corrected

l54. The phrase sounds a little bit strange. Please consider : Although such system seems to reach similar precision on d13C (< 0.2 ‰) than in situ sensor, the horizontal profiling and 2-D mapping of d13C field above the surface by Lidar will bring new information on sources/sinks pattern and origin. ->

Although such a system seems to reach a similar precision on d13C (< 0.2 ‰) than in situ sensors, the horizontal profiling and 2-D

mapping of the d13C field above the surface by Lidar will bring new information on the patterns and origins of sources and sinks.

Corrected

l55 I wonder whether "Even" is the appropriate word to be used here and "stable water vapour" is strange terminology. You probably meant stable isotopologues of water .... Please consider : Moreover, the vertical profiling will help characterise the local and long-distance transport of CO_2, in a similar way than stable isotopologues of water vapour doalready (Hamperl et al., 2022).

I modified teh sentence with « Moreover, the vertical profiling will help characterize the local and long-distance transport of CO_2, in a similar way than Lidar measurements of water vapor stable isotopologues do already"

l124 change "<<" using the corresponding symbol

Corrected. ($\tau_2 \ll 1$)

l125 in the 2.05 band -> in the 2.05 µm band, Corrected

l125 "For one part" is confusing as there is no other part. Did you mean "partly" ? yes replaced by „partly".

l131 Note that isotopologue abundance taken in the ... gives -> Note that isotopologue abundances taken from the ... yield

Corrected

l154 Both seeder l1 and l2 -> Both seeders, l1 and l2,corrected

l155 "built with low pressured 80-cm path gas cell" -> "built with a 80 cm path gas cell" (no need to mention "low pressure" here, the pressures are indicated) ok. corrected

l155 and elsewhere in the manuscript: delete hyphen between number and unit (see https://www.atmospheric-measurement-techniques.net/submission.html#math) mbar has been replaced by hPa.

Table2 Are units in the receiver characteristics correct ? What is a Real time 38.4 m range gate ? Shouldn't this be a temporal gate ? For readability, please separate signal processing elements by comma or insert a line break before Discrete Fourier Transform ...

Modified with « Real time 256-ns time gate (38.4-m range gate) Discrete Fourier Transform (DFT) spectrum accumulated over 1-s (2000 shots); Post-processing with Matlab software squarer and Levin estimators" Corrected also in the text L197

l157 and others, please delete - as a

I haven't found « as a » in the text..

l159 Phrase is not clear. Is the Allan deviation better than 1 MHz between 10 s and 10 min ? Then I suggest to write it as such. One could theoretically imagine that the

spectral precision gives a different result than the accuracy, but then a "respectively" would be needed.
Right. I modified this part with : „The spectral precision of each wavelength presents an Allan deviation better than 1 MHz between 10 s and 10 min (Gibert et al. 2018). In addition, the accuracy of each wavelength is within 1 MHz.”
l189 second flooor of LMD building -> second floor of the LMD building. Corrected

l192 ratio -> ratios. Done
l199 Doppler -> The Doppler. Done
l246 errors on -> errors of the Done
l279 errors on -> errors of the
replace "error on" by "error of" throughout the manuscript Done
l157 delete "rough" ok
l301 DIAL equation -> the DIAL equation ok
l312 Assuming we can -> Assuming that we can ok
l314 which keep the numbers -> which keeps the numbers ok
l327 likely to be due ->likely due ok
l330 on the point of view -> from the point of view ok
l349 put "," before "as expected" ok
l366 delete ":" ok
l367 prevent us -> prevents us ok
l374 has been -> have been ok
l375 add "a" before "Monte_Carlo" ok
l382 precison around -> a precision around ok
l383 using -> using an ok
l384 avalanche photodiode -> avalanche photodiodes ok
l384 detector -> detectors ok
l416 Despite .... seems -> Despite .... seeming ok