RESPONSE TO RC2 https://doi.org/10.5194/essd-2025-194-RC2

Specific comments

1. *the choice of sites studied: more details should be provided on the selection of the analysed caves. A brief description of the sites should be included, highlighting any distinctive features that justified their inclusion in the catalogue (such as morphology, type of conduit, accessibility and geological representativeness). This would clarify whether the selection was guided by specific scientific criteria or logistical considerations;*

Response: we agree that more contextual information on the various sites and how they fit the selection criteria for inclusion in the catalogue should be provided and propose to include an additional table summarising the notable features, geological setting and location of each site, as well as the total scanned length and the scanning instrument, BLK2GO or Faro Focus, as required.

2. *acquisition and timing: it would be appropriate to indicate the acquisition timing for each site, at least in general terms: how long it took to complete the surveys; whether the caves were surveyed in their entirety or only partially; and, if partially, the reasons for any incompleteness (e.g. accessibility limitations, environmental or technical conditions);*

Response: As indicated in reply to RC1 (https://doi.org/10.5194/essd-2025-194-RC1), this additional information is included for Markov Spodmol, and for two endmember caves with various geometric settings and acquisition strategies. We do this to provide upper and lower bounds of acquisition speeds for any other potential LiDAR SLAM users.

3. *Data comparison and validation: Comparing LiDAR point clouds with traditional speleological data is crucial for validation. In the case of the Markov Spodmol cave, a detailed comparison was made using splay shots. However, it is unclear whether this comparison was extended to other sites in the catalogue. If similar comparisons are available for other caves, they should be mentioned explicitly to reinforce the reliability of the entire dataset;*

Response: We only performed the detailed splay to point cloud comparison and validation at this specific site. For other sites, a centreline and splay shots are also available to a limited extent (e.g. Vallorbe). Wherever applicable, we will now report the RMS error on the residuals of scan target registration to provide a comparison between the distoX and LiDAR SLAM acquisitions.

4. *Redundancies: The text is generally well written, but some concepts are repeated in different sections without providing additional information. For instance, the use of the dataset for geomorphological analyses, numerical simulations, and hydrological studies is reiterated in the abstract, the introduction, section 2.1, and the conclusions.*

Response: the potential use cases of the dataset are indeed reiterated. In order to provide additional detail, we propose to expand the introduction to show case the value of such datasets in speleogenetic interpretation, geomorphological analyses and hydrological modelling. We will do this by referring to additional existing studies in which the use of LiDAR acquisitions is central.

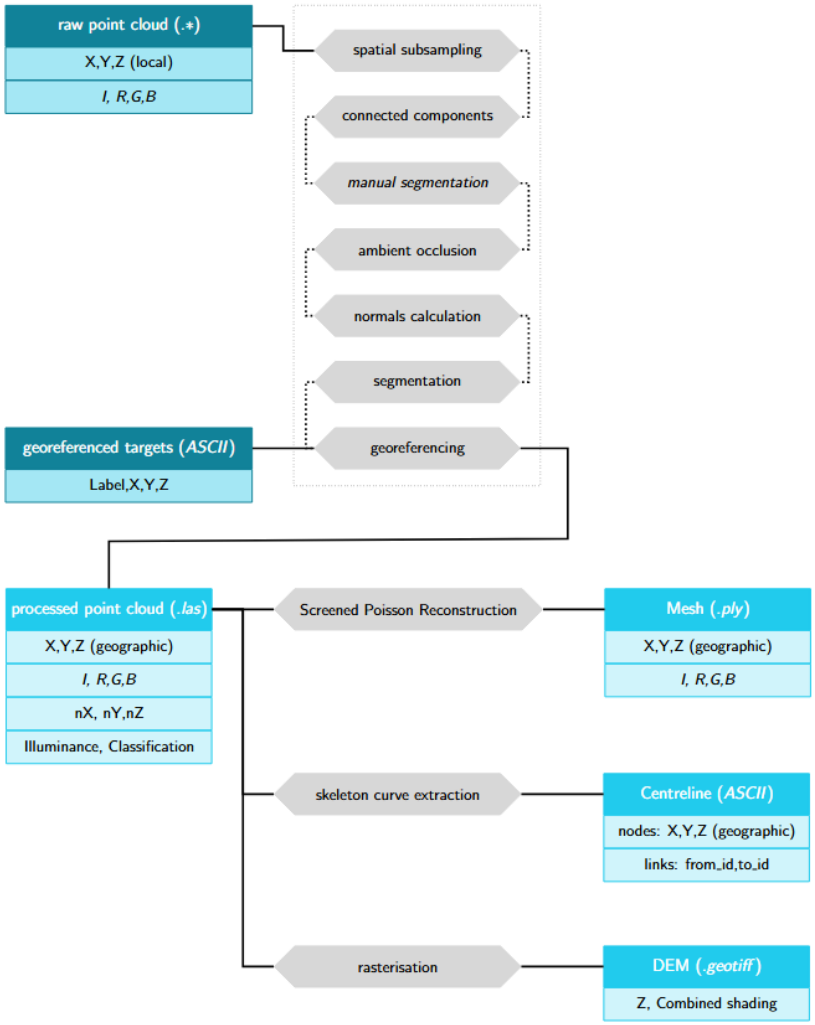
Technical corrections

- *Lines 14–16: The term 'LiDAR' is used without the acronym being defined. The definition does not appear until line 35. It is recommended that the first definition be moved to the first occurrence, as per editorial convention;*

  Response: we will change this to define the LiDAR acronym at these lines.

- *Figure 2: The figure is useful, but rather dense, and could benefit from improved readability;*

Response: we agree that it is dense in its current landscape format, making the text less readable. We propose the following update to allow it to breathe.



- *Section 2.3: I suggest adding a comparative figure to the section, showing a point cloud before and after noise filtering. Such a visual comparison would effectively*

highlight the impact of the cleaning processes and improve the readability of the section;

Response: agreed, we append a figure highlighting the systematic and manual noise removal in a before / after image in the appendix as follows:

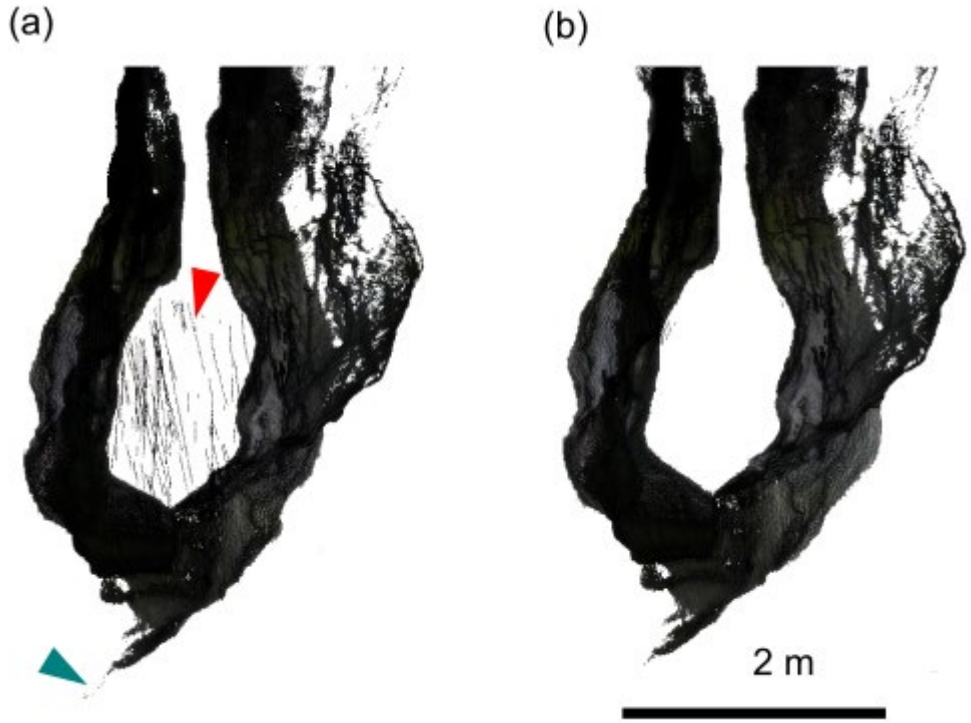


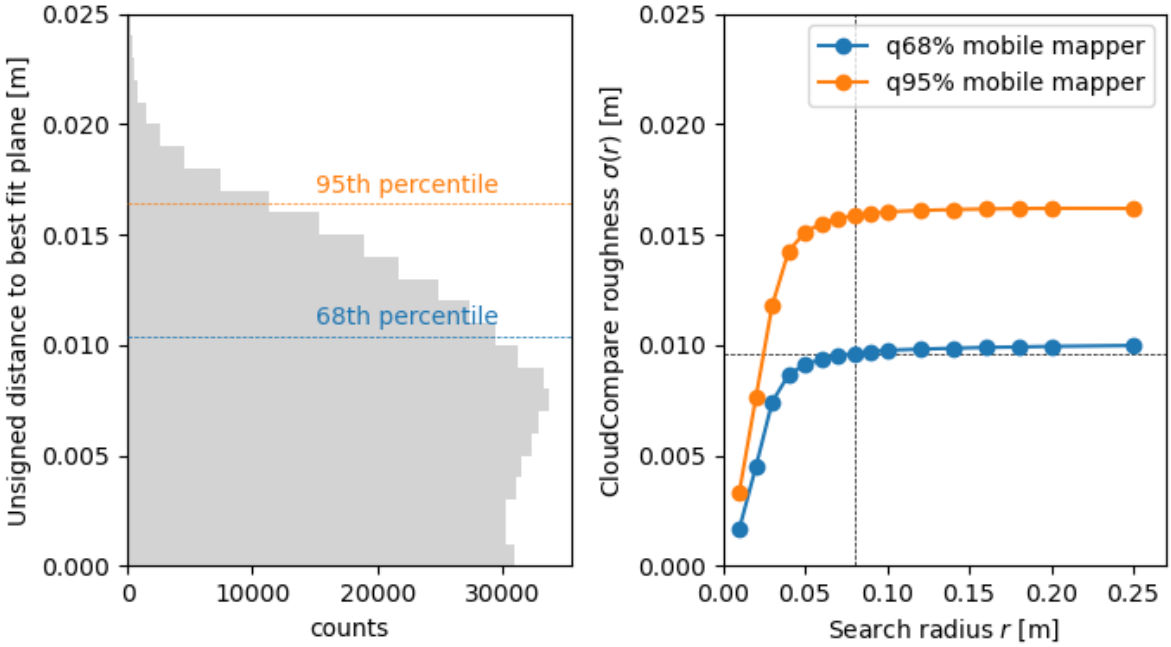
Figure X: Illustration of the cleaning process (a) before automatic removal and manual segmentation of noise points, (b) after cleaning. In red: trails arising from the scan operator scanning themselves in the narrow passage. In blue: lone points corresponding to narrow fissures incompletely scanned.

- *Line 151: CANUPO: The name of the algorithm is reported correctly, but is never explained. I would add a brief explanatory note: "...using the CANUPO algorithm, a supervised classifier based on multi-scale analysis of local geometry...";*

Response: a good point. We will include this in the updated manuscript.

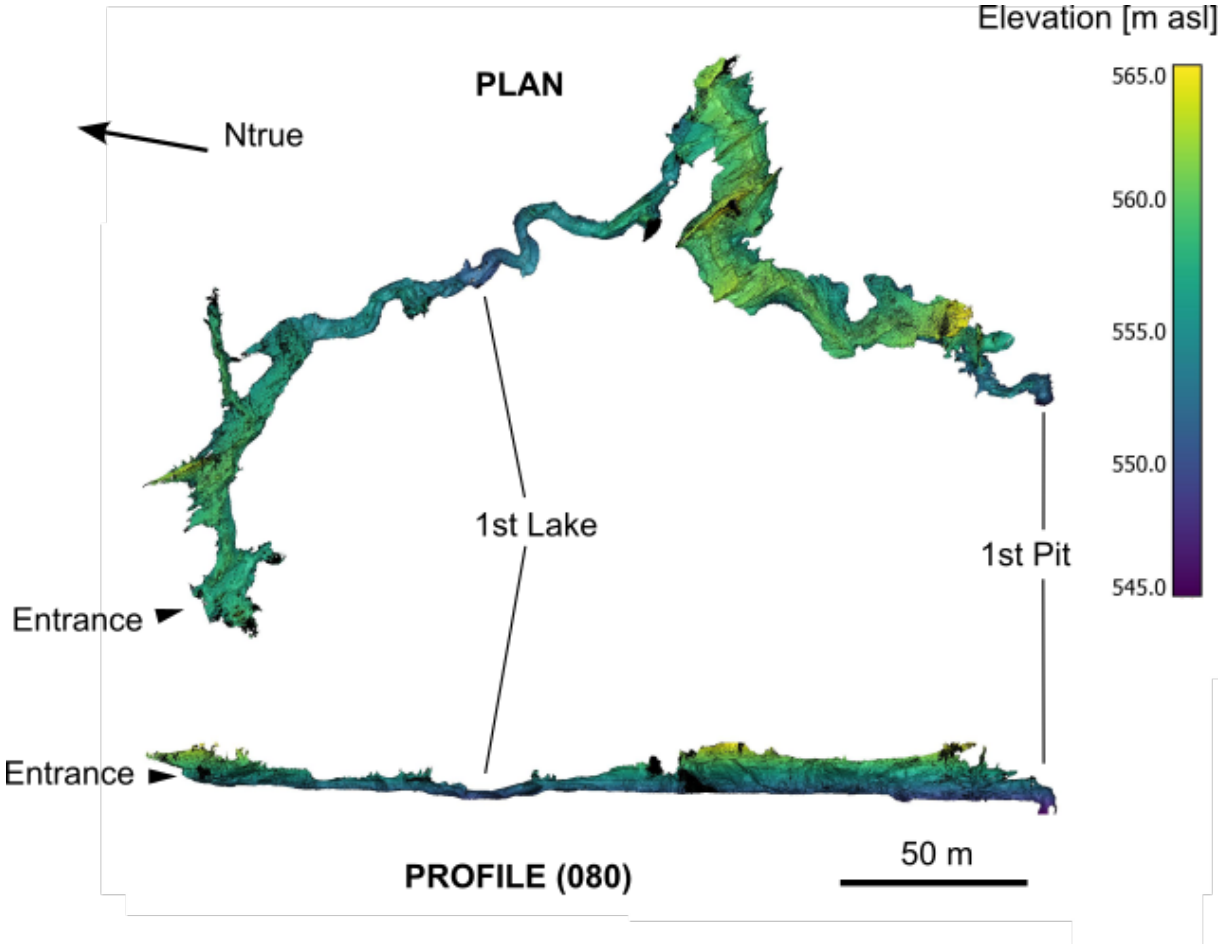
- *Figure 4: The figure is difficult to read due to the small font size used in the label texts and legend;*

Response: we may increase the fontsize in the label text as follows:



- *Figure 6: It would be advisable to make the legend more readable by enlarging the font size. In particular, the unit of measurement should be included in the DEM legend;*

Response: we agree, and in keeping with our response to RC1 (https://doi.org/10.5194/essd-2025-194-RC1) we combine both panels of the figure propose to increase the fontsize as follows:



- *Figures 7, 8: The figures are difficult to read due to the small font size used in the label texts and legend.*

  Response: Figure 7 has been updated according to our response to RC1 to include a third panel and further updated here to increase the font size.

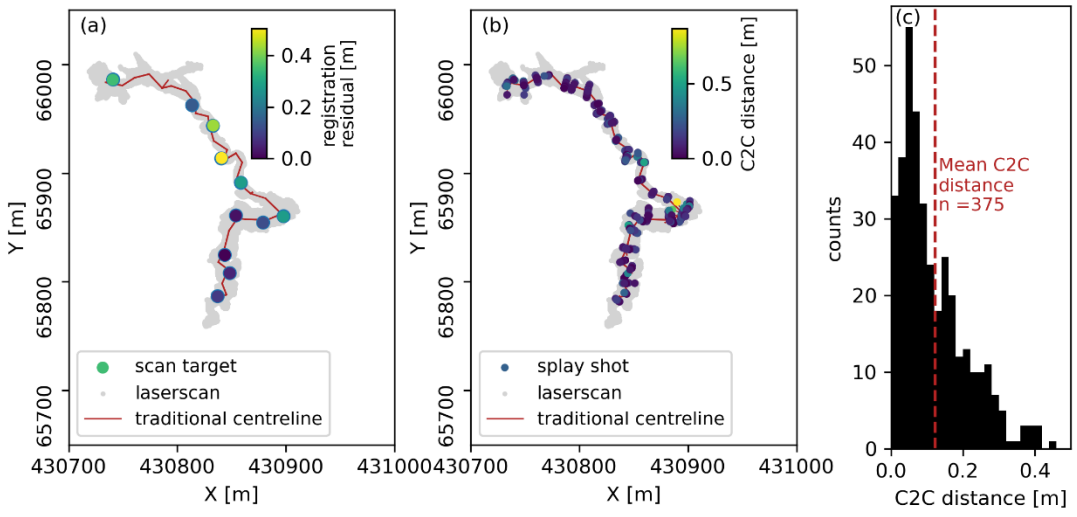
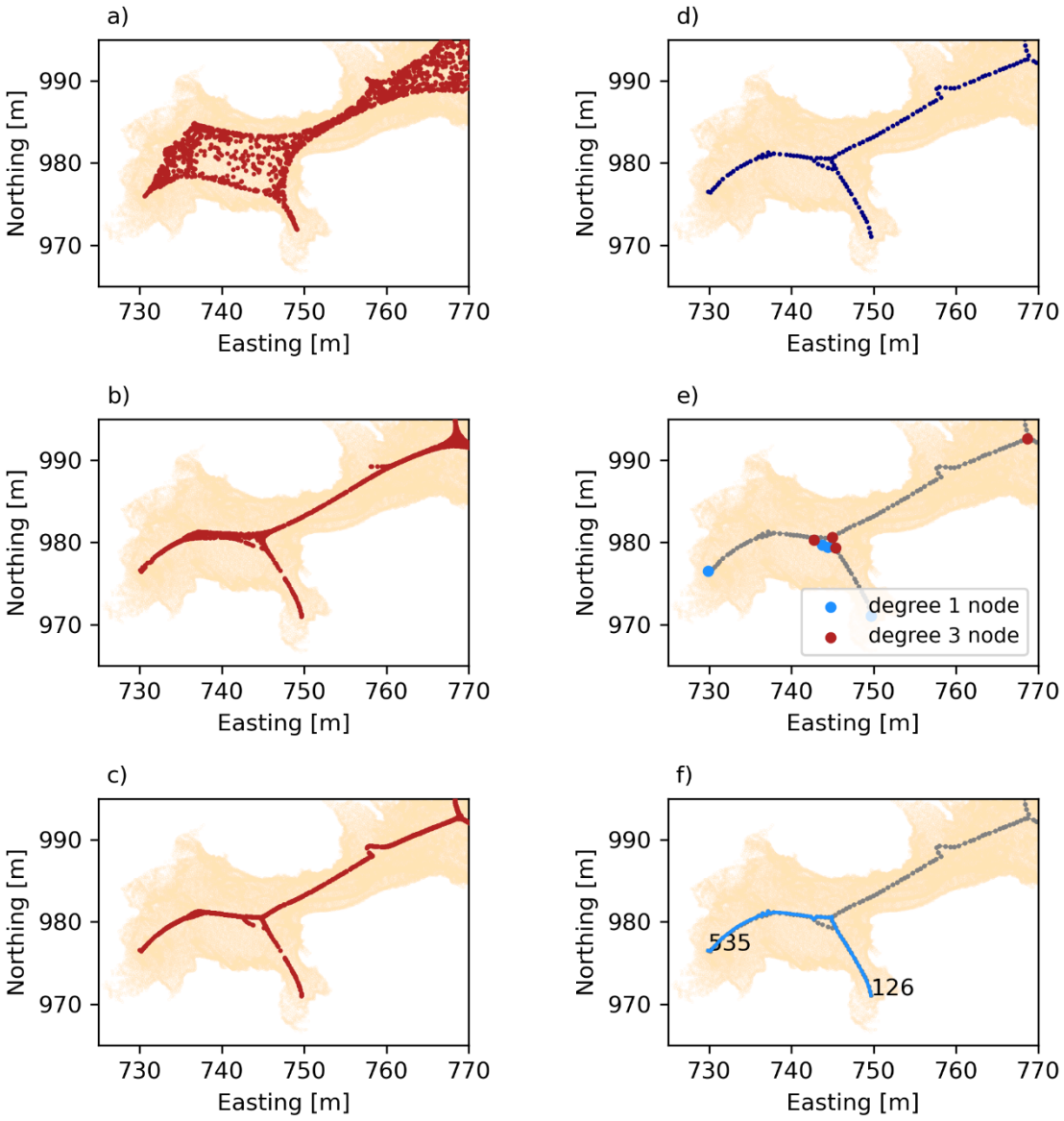


Figure 8 has also been updated to increase the fontsize and improve readability. Here we move legend items to the figure caption.



Detailed point cloud contraction and skeleton extraction workflow for the example of Markov Spodmol cave. (a-c) point cloud after 1, 2 and 4 iterations of Laplacian-based contraction using the algorithm of Tagliasacchi et al. (2016). (d) spatially downsampled skeleton point cloud. (e) reconstructed Minimum Spanning Tree (MST) with degree 1 and degree 3 nodes highlighted, (f) example of a walk between named nodes 126 and 535 along the MST graph from a source to a target node. Coordinate reference system: EPSG:3912