L165ff: This section describes supervised and unsupervised ML methods. Various soil parameters are used for PCA, such as BD, C, N, P, pH, COCO3 and others. The methods section does not describe the analysis of these parameters, nor does it provide references to other publications where these parameters have been analysed. These data are also presented in the Supplementary Table S1 for the different soil types and also for the horizons. However, it remains unclear where the data comes from or how they were measured.

*Authors' response: We appreciate this observation. This information is now presented in line 105 of the revise manuscript.*

When comparing the values for the different horizons, it is very remarkable that they are similar, sometimes down to the decimal place. From my experience with soil analysis I am not familiar with such results. These parameters are not only used for the ML, but also used for the discussion, as they have a significant influence on the work presented. Since a significant part of the work presented is based on these values, the analysis of it should be presented in a comprehensible way.

Figure 2: pleae adapt the figure, as it is hard to read the content (too small). Please indicate what the black dots represent (outlier or means? as the bars are quite small, it is also hard to distinguish between dots or letters)

*Authors' response: The values presented in Table S1 have been thoroughly revised, and the PCA analysis has been reformulated accordingly. Some of the similar values (identical to the decimal place) result from the relatively low variability of the corresponding soil properties and the precision limits of the analytical methods used as described in line 105. Nevertheless, all data were collected at the central laboratory of ZALF, using reliable instrumentation and standardized procedures.*

*All figures have also been revised and are now presented in an updated format.*