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# *Interactive comment on* "Long-term Field Experiments in Germany: Classification and spatial Representation" *by* Meike Grosse et al.

**Anonymous Referee #3**

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I am very pleased that the German long-term field experiments (LTFE) are now being presented to an international readership in this comprehensive manner. They have a long history and many of the findings made there, as well as the long-term data series, are of great value to the international soil science community and also allow a better understanding of the temporal dynamics of agricultural land. I therefore welcome this manuscript and believe that it is excellently placed in the journal SOIL. Since the journal has open peer review, I can dispense with the repetition of aspects already mentioned in the previous reviews. Overall, I support all comments made there, with the exception that, unlike reviewer #1, I consider this manuscript to be highly interesting for the international readership.

General comments:

The Material and Methods chapter explains how the geospatial analysis is done and also the classification criteria for the LTFEs. However, there is no information on how the experimental design should be analyzed as stated as one of the two main objectives of this study. Do statistical methods come to use? Which ones? The pure assignment of LTFPs to four different classes (five in table 1 and eight in figure 3?) without further statistical analyses (e.g. various types of discriminant analysis, contingency and cross tabulation, factor analysis) is not very appealing. The same holds true for the analysis of the data for climate (CWB) and soil fertility (MSQR) given as number of cases and percentage of share of classes (tables 2 and 3). I am convinced that the manuscript would greatly benefit from a profound statistical analysis and that this would allow (i) a critical discussion of the value of the data that exist so far and (ii) to conclude how such laborious and expensive experiments could be designed in future. A purely qualitative, merely descriptive analysis has certainly been carried out to a sufficient extent in the large number of papers already published on this subject, most of them mentioned generously. A discussion of the results including international literature and experiences of long-term experiments, e.g. from England, China or the US, is missing to a large extent. I recommend that the discussion be significantly revised and expanded in these points. Appropriate quantitative methods for the analysis of the experimental design and the spatial distribution of the experiments with regard to climate and soil fertility should be added. Summarizing, the manuscript appears to be immature in itself and its analytical stringency needs to be improved. Since I consider the topic timely and of high scientific importance, I would be pleased if the authors would thoroughly revise the manuscript.

Specific comments:

Line 49-55: the enumeration of the number of LTFEs published over the years by Cherries seems unnecessary in this way. If the details here are important I would recommend to present it as a table.

Lines 63-80: after the objectives of the work have been formulated in lines 61-63, the

explanations given here seem like a description of material and methods. I recommend to shorten this part and to integrate it into the chapter Material and Methods.

Line 68: what is meant by research parameters? Please list.

Line 83: after the explanations in the introduction regarding the work on the German LTFEs prepared by Koerschens et al., it seems incomprehensible why a new literature study should be made here and would require a corresponding justification. This should also explain why the work of Koerschens et al. is obviously not adequate to follow the objectives of this study.

Line 95: here, too, the technical justification for the selected research topics is missing. Especially with regard to the aspect of a meta-analysis of the research statements, which was prominently emphasized in the introduction, the research topics listed here appear incomplete.

Lines 200-206: the description of the methodology belongs in the corresponding chapter and is superfluous here, as are lines 208 and 209. Similar mixtures of results and material and methods are also shown in the following chapters. I would recommend to check the results part and to concentrate all methodical information at the appropriate place.

Figure 1 does not seem necessary to me, the content is very simple and directly repeats the statements in the text without a gain in information.

The core statements in figure 3 could certainly be presented much more clearly. At the moment most of the space is taken up by the legend. It also seems unusual to me that the figure itself contains a headline ('Start of LTFE').

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