

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

### **Anonymous Referee #1**

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This paper presents an interesting analysis on long-term field experiments (LTFEs) and their representativeness in Germany. The paper shows the diversity of the experiments and that they cover most climatic water balance classes and also soil quality classes. This is an interesting result. The paper is written well and is nicely structured. For the international readership of SOIL it might be of limited interest, since all results are related to Germany without direct implications for outside Germany.

The most striking challenge is the data availability. So far, the work presented in this study on a common database for German LTFEs was mainly concerned with compiling meta data from the LTFEs. This is of great value that will be appreciated by the scientific community. However, there is no clear plan how to make all or most data from the LTFEs accessible and open access also to the international soil and agricultural

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science community. Out of more than 200 LTFEs only two LTFEs were indicated in the map as “data available” and only seven additional sites with “data available soon”. In the paper the great value of combined analysis of many LTFEs is described (e.g. l. 23 f). However, if the data of the LTFEs, such as soil properties and yield, are not available, not harmonized, not quality checked and not open accessible, such a combined analysis is not possible. The work presented in this study is a first step towards such analysis. However, it needs to be outlined how the next steps towards full data accessibility will be achieved for how many LTFEs. Without the next step the first step is of limited value. In l. 18 it is claimed that the presented database are an important step to provide access to the research data. More details need to be outlined how this access will be provided in the future. The one sentence in l. 68 (“There is a focus on research data from LTFEs”) is not enough.

l. 136: This study shall be published in a soil science journal. However, in particular the representativeness analysis for soils is rather incomplete. It is restricted to one soil quality indicator and this indicator was available only for croplands. Thus, it is missing for 28% of the LTFEs. Maybe more abundant soil data, such as texture or soil type, can be used for classification and the representativeness analysis. Texture is the major soil parameter that can hardly be changed with management and influences all soil processes and plant growth. In l. 267 a study is mentioned that found under-representation of LTFEs on clayey sites. This result cannot be compared with the recent study since such an analysis is missing and would significantly increase the value of this study.

Additional comments: l. 6: Soil monitoring of climate impact can be performed much more cost efficient on permanent sampling sites (such as “Bodendauerbeobachtung”). Since LTFEs do not represent real practice field sites they might miss some trends that can only be monitored at farmers’ field sites. The value of LTFEs is to provide data on management impacts (under changing climate).

L 16: The representation and distribution of management options in the LTFEs is miss-

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ing as a result in the abstract. Since this is the main aim of LTFEs it would be worth to include one or two sentences on how management treatments are covered in LTFEs in Germany.

I. 28: In agriculture, plant nutrition is linked to fertilisation. Thus, these are not two but one and the same aspect.

I. 39: The definition of “control treatments” is not clear. Is the control treatment defined by each LTFE or does it depend on the study? Customary or common management practices are changing over time e.g. the fraction of reduced tillage or fertilisation type and amount. Is the control treatment than also changing over time?

I. 45: Change “landscapes to “soil” since LTFEs does not comprise landscapes.

I. 99 and 102: Why 191?  $94+87=181$

I. 156: It is not comprehensible why many grassland LTFEs were excluded. This need to be explained and justified since grassland trials are under-represented in the compiled LTFE dataset. Above it is written that LTFEs are useful beyond the original scope or research theme. Here it is argued that the research theme of the grassland trials did not fit and were therefore excluded.

I. 192: What is a technical college? A university of applied sciences?

I. 200-206: This section is redundant and repetition from above an can be removed.

I. 214-I. 223: For an international readership of the journal, it would be good to provide a map with the names of the regions mentioned here or include the names in Fig 5.

Fig. 3: The colours are not easy to distinguish, in particular that for tillage, fertilisation and crop rotation.

Fig 5 and 6: The dispersion of points from only single experimental sites with different experiments results in biased impressions, e.g. that the whole region of Halle is covered with LTFEs even though there might be only one single experimental site. I

propose to either strongly reduce the dispersal of the points from one site or completely avoid them since this map aims at illustrating the spatial distribution and representativeness of LTFEs and one site with many trails mostly does not contribute in achieve a higher representativeness of soils and climate.

Fig 5: The map seems to be incomplete for German agricultural land (with is the reference for this study). Mostly grassland seem to be missing, e.g. in the pre Alps, the Sauerland or in North-Western Germany. Readers expect that the class “other land” comprise only non-agricultural land. Maybe CORINE data are not appropriate but ATKIS Basis DLM data can be used.

Fig. 7: This illustration with boxes is unusual and thus difficult to read. Since the y-axis contains distinct values (no classes) a representation with points or lines would be more appropriate.

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