Review of: "Spatial Analysis of Soil Fertility Using Geostatistical Techniques And Artificial Neural Networks"

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Potential competing interests: No potential competing interests to declare.

General comments

-A lot of references are old or not the most relevant in the field. Please try to include other references.

-The work is not new and the practical implications of this work are very limited and mostly confined to the study area. However, this is not necessarily a problem, though more discussion on this should be needed, especially comparing the maps and their statistics to other literature.

-M&M is insufficient. When dealing with soil fertilty, lab methodology for soil analysis and literature for referencing values are indispensable. Both are missing.

-Length of the work is sufficient given the contents.

-Find more detailed feedback below.

Introduction

“There are few research works in the field of soil science that take into account the combination of individual properties to express them as soil fertility categories.”

-This is for good reasons. One cannot generate fertilizer or agronomic recommendations based on a soil fertility class, it depends on the underlying issue. Generally I have problems with these soil fertility classes. There is no mentioning of the crops mostly grown in the area and the perception of soil fertility depends to some degree on the crop demand.

M&M - Soil sampling

-The soil testing methods are not specified. Please do so.

-What is assimilable K? Do you mean exchangeable?

-You later (Results - statistical analysis) state that P levels are low to median and K levels are median to high (etc.). Please provide literature references to which you have compared your soil test values. And again: whether a level is low, median or high depends on the crop!

M&M - Interpolation of soil properties

-How many folds were used for the cross-validation?

-How many validation points were used per fold?

-How are the mean error standardized (MES), root-mean square standardized (RMSS), average standard error (ASE) and confidence level (%CL) defined? These are not common statistical measures. Please provide references.
-Please mention how data was transformed in case this was deemed necessary.

Table 1

-Please change Ave. to mean
-Decimal separator should be a point and not a comma
-MO (%) should be OM (%)

Figure 4

-Are the high average values correct in 2nd and 3rd figure on the right? There seems to be a strange outlier in each figure.
-It is not clear which semi-variogram belongs to which soil parameter.

Figure 5

-Names of soil property and scales are not easy to read. Please enlarge.

Table 3:

-RMSS is not mentioned in the table, only RMSE.

“It is observed that the models that best fit the data used meet the requirements of small RMS, small ASE close to RMS, RMSE close to 1 and a high percentage of reliability.”
-An RMSE close to 1 as a measure for reliability does not make sense. RMSE values will strongly depend on the values of the soil parameter.

Figure 7:

-Valor should be value
-What is Ë?

Conclusions

-The first two sections do not provide any new information, I could have concluded this without reading the study. Soils are heterogeneous in nature.
-I miss comparison of the accuracy of the maps to other literature.
-"The information provided by the spatial analysis of individual soil properties and the map of nuro-fuzzy fertility classes is complementary, and can be used as a basis for soil resource management in the area." I understand these maps can be relevant for this specific area, although I think farmers usually know which parts of their land are more or less productive. Why not just use a map of standing biomass in the growing season, based on satellite data? This similarly provides a

good overview of more and less fertile spots and can be easily upscaled in contrast to developing maps with kriging based on soil analysis data. Generally, I find it difficult to see how the results of this study can be generalised. Also, “nuro” should be neuro. Please check the language throughout the document.

Hopefully my comments will help to improve the work.