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.

The proposed paper calculates semi-variogrammes on different variables, some of them are not additive.

Page 4, what would be/is the interest to check that the pH distribution follows a normal low ?

Page 5, the presentation of the structure of the semi variogramme assumes in this paper that there is only one structure (no nested structures are supposed to be revealed), and that all variables are stationnary (no drift possible).

It is, in my opinion, necessary to conduct a calculation of directional variogrammes. With the pictures presented, with the samples locations, a calculation of gamma in four directions (lines (roughly N75) , columns (roughly N165), and 45 degrees in both directions (roughly N30 and N120)) should be done, on each variable, at least for the 4 first distances between samples… or (square rooot of 2) * the first 3 or 4 distances in the directions N30 and N120, with the 4 results in each direction plotted on the same diagramme (with the results with the (square root of 2) distances correctly positionned on the X-axis of the diagramme).

There is on page 8, 4th paragraph, the indication that an isotropic variogramme was considered… This should be checked in detail, when looking at the final result where is seems obvious that the quality index seems to improve along the N75 direction, from West to East… Probably, one or several variable do not follow an isotropic variogramme, if they « explain » the apparently anisotropic integrating fertility index.

From a general point of view, when the results of C0 and C1 are presented in table 8, the ratio C0/(C0+C1) could be added in the table … I evaluated it, before reading the comments, page 11, especially for the variables Sand, K and Ca, that appear to be the least structured.

Concerning the presentation of the variogrammes page 9, the X-axis coordinates could all be simplified using the values, 10, 20, 30 … meters . If possible give the number N(h) (equation (1) page 5) of calculations for each distance (h), and indicate it near the now red dots….

In order to ease the reading of the paper, on the same page 9, the Y axis could also have rounded numbers …

Page 8 , for the values of C0 or C1, for P for instance : C0 could be 0, and C1 could be 82 … 4 figures for the sill determination seems a bit much. For the range if 60 m (6 E1) were proposed (and not 59) for most variables (not P) I believe it would be OK.

Concerning the input of the « input layers », page 5, last paragraph, please comment more on the techniques used to produce the « normalized variables » ? are they all introduced between 0 and 1 ? not much detail is given.

Are the neurons used in the model presented in figure 3, « perceptrons » ? May be elaborate more on the how the « cross validation » process was performed, page 7.

Please try and discuss with pedologists/ the farmers ? about the hypothesis concerning a different range for P (any additives taken to this field with P related products ?) … Is there any interpretation about an « anthropogenic » factor concerning this particular variable ? Please alos check in detail the isotropy or anisotropy of the variogramme concerning this variable P in particular.

Hoping these comments are helpful.

Regards,

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