

Interactive comment on “Spatial variation of soil physical properties in adjacent alluvial and colluvial soils under Ustic moisture regime” by M. Sağlam et al.

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The paper treats a mere description of the spatial variability of some soil properties of two adjacent fields differently classified (alluvial and colluvial soils) and agronomically managed. The authors apply standard univariate techniques to produce thematic maps and the comparison between the two types of soil is based only on visual inspection of such maps. Most of their comments are quite subjective and questionable. Moreover, despite the importance of such an analysis in site-specific management, the authors do not develop sufficiently the issue about the impact of management on soil proper-

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ties and how such spatial heterogeneity may affect water and nutrient applications in agricultural production.

The paper should be deeply modified in terms of objectives, which cannot be restricted to mere assessment of spatial variation, methodology, searching quantitative relationships among the variables, and results by stressing the impact of spatial variation on agricultural management.

Hereafter, the authors can find some suggestions on how to improve their work:

- At page 4263 line 18: after “distribution” it should be added: “at the scale required by site-specific management”. In order to establish significant relationships among the variables, it is important that all variables (texture, soil water content, plant available water, etc.) are referred to the same spatial support.
- As I said before, the objectives should be expanded to a quantitative comparison between the two different types (alluvial and colluvial) of soil.
- At page 4265 section 2.3: Write “twenty eight” instead of the figure of the transects. The creek should be clearly localized in fig. 1. The criteria of selection of samples on each transect should be specified.
- At page 4265 section 2.4: not all statistics are reported in table 1; minimum and maximum values, skewness and kurtosis are missing. Moreover, in table 1 there are reported Ks and AWC which are not described in the text. The methods of analysis and the measurement units should be reported.
- At page 4265 section 2.5: substitute “distribution” with “dependence”, because semivariogram is a measure of dissimilarity and then of spatial association between samples.
- At page 4266 lines 6-8: it is the **number** of pairs that varied in each lag. Substitute “safe calculation” with “reliable estimate”.

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- At page 4266 lines 10-14: the least squares technique was used to estimate the semivariogram parameters but the goodness of fitting was evaluated by cross-validation. This test should have been used to select the semivariogram model.
- At page 4266 lines 22-24: since the textural components sum to 100, only two of them should be independently estimated and the third one derived from the estimates of the previous two.
- At page 4267 lines 9-19: I cannot understand if this description of the fields derives from the authors' knowledge or from the results, because in this last case the authors have to refer their comments to tables or figures in the text as they actually do afterwards. The authors should clarify why they assert that "clay content in the alluvial area is higher", since the means are the same and only the variation degree is different.
- At page 4267 lines 25-27: at this point the authors should comment the characteristics of the variograms for the two soils and how they impact the type of spatial distribution (short- against long-range, structured (low nugget ratio) against more erratic variation) without several repetitions in the text.
- At page 4268 lines 1-7: the variograms should be analysed in terms of sill and range, because the increase in semivariances depends on the scales of graphs which are different, because the sills are different. It is the sill of SOM (not AWC) that is higher in colluvial soils compared with alluvial soils.
- At 4268 lines 13-16: before pooling the data from the two soils, heteroscedasticity of variance should be tested; the two soils seem to show different variances (different sills) for most variables.
- In Discussion section the authors try to establish spatial relationships between the variables and disclose similarities or dissimilarities between the two types of

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soil. All these comments are based on visual inspection, they are too generic and qualitative and mostly even questionable. Each assertion should be verified and justified. Any multivariate analysis is lacking in the text. The paper would be greatly improved by a multivariate geostatistical approach, however the authors have to add some sort of correlation and/or regression analysis so to prove what they assert.

- At page 4270 lines 4-13: The authors speak about “trends” but all the variograms are upper bounded, i.e. the variables are stationary. Probably they mean that anisotropies occur on the field but this has to be proved through directional variograms.
- At page 4270 line 26: change “rigorous” with “vigorous” or luxuriant.
- At page 4271 line 26: check the percentages.
- To improve the text the authors should focus on the impact of soil properties on moisture regime and soil tillage and agricultural management.
- The maps of all variables should be reported in the figures.
- The language is not always fluent and clear and the text should be checked by a native speaker.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 4261, 2011.

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