Hydrol. Earth Syst. Sci. Discuss., 8, C4029–C4033, 2011
www.hydrol-earth-syst-sci-discuss.net/8/C4029/2011/


Hydrology and Earth System Sciences Discussions



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

**M. Sağlam et al.**

hozturk@agri.ankara.edu.tr

Received and published: 14 September 2011

Response to REF #3

Thank you for your comments and suggestions on structure of our manuscript. we have modified the manuscript accordingly, and detailed corrections are listed below point by point: Critiques:

1. the lack of methodological description and interpretation provided by the authors

Our response: After the comments of other two referees and our corrections and addi-



Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

tions the results and discussion sections become better than previous version.

2. Does the methodology used is sensitive to outliers ?

Our response: The model we used does not use outliers data. All the data within the range are not outliers anymore whatever the distance is. All the points within the range of any specific variables were used to produce map. The data out of the range do not affect the center. Therefore we did not employ any analysis for the detection of outliers.

3. A major a relates to the use of the statistical tools (i.e., geostatistics) to analyze the spatial distribution of soil properties and water content data, as the use of geostatistics it is not clearly justified in the paper. It is my understanding that linear geostatistics is a parametric method that works on the assumption of normally distributed data. Thus this approach is sensitive to outliers and deviations from normal distribution of the data.

Our response: We checked the normality of the data by skewness. According to Webster (2001) data with a skewness <0.5 needs no transformation, with a coefficient of sekewness between 0.5 and 1.0 is suggested a square root transformation and > 1.0 logaritmic transformation is applied. Based on this, calculated coefficient of skewness and applied one of above mentioned transformations.

4. The available water content is dynamic variable compared to other variables used in the study. The variogram parameters will be different for wet and dry soil moisture scenario. Therefore with the single set of soil water content data, it is difficult to justify the relationship.

Our response: We determined available water content as difference between pressure plates measured field capacity and wilting points. Also, there are number of published papers that reported geostatistical analysis of AWC as we applied here. In the previous version, we did not provide the methodology of the soil analysis included AWC. Now, they are added after some comments (Section 2.3). The available soil water content was calculated by subtracting the soil water content at permanent wilting point (PWP),



HESSD

8, C4029–C4033, 2011

Interactive Comment



(-1500 kPa) from field capacity (FC), (-33 kPa). Since both PWP and FC are mainly constant in the short run, AWC is a constant variable. Of course soil moisture content is very changeable properties, but AWC is the maximum available soil water (for plants) held in the soil.

5.Table 1: Why CV is large for whole area, where mean and standard deviation compared to alluvial and colluvial soil are not varied much.

Our response: We rechecked Table 1 and made corrections on calculations. The CV values for whole area in the Table 1 are unfortunately wrong. During the copy-paste procedure, the numbers from the excel sheet changed and we missed them. One of the other referees has warned us and they are corrected and presented in Table 1. Please see the revised version.

6.Table 1: There is no discussion on fitting spherical, exponential, Gaussian models for different variables? Does correlation (R2) is only basis?

Our response: No, we considered coefficient of determination, residual sum of squares, and correlation coefficient of cross-validation to judge the quality of fit. We included the necessary information on fitting semivariograms to data. Please see the revised version.

7. Table 1, Figure 2, Figure 3: Silt and Sand varigram data showed in Table 2. However, Variogram is missing for Silt and Sand. In the kriged map for Silt is missing. This shows poor organization of paper.

Our response: We inlcuded the figures. In fact we have produced all of them. But, due to shortage of place and limitation, we have chosen some of them and presented in figures. After the comments of other referees and yours, we organized and presented all the missing maps and variograms. Please see the revised version.

8.Figure 2: The plots are very poorly presented. There is no consistency in scaling (Decimals). Further, for the sake visual comparison, the lag distance for alluvial, collu-



HESSD

8, C4029–C4033, 2011



vial and whole area should be within same range. That gives better insight data points.

Our response: We made the changes, accordingly.

9. The legend values for some soil variables are different between the sites.

Our response: Yes legend class is different. Initially, we have produced maps with the identical legends. Since the value of soil properties is different between the sites, some details are lost and sometimes there is only one or two class appeared in one site, when we used the identical class values. Therefore to be more understandable, we used different legend values for clay and BD.

10. Page 4264: "The objectives of this study were to characterize spatial variation of soil physical properties in a large state farm covered by alluvial and colluvial soils with known long term management history." What kind of history data used in this study? Do authors want to use time series of data to analyze change in variogram parameters with respect to time?

Our response: The objective of this study was to compare spatial variation of some soil physical properties in adjacent alluvial and colluvial sites and to analyze advantage of using local semivariograms over global semivariances in kriging estimations. We have initially wanted to figure out the effect of soil management information (soil use, crop type, crop rotations, fertilizers used etc,) on soil properties in the long run, too. We have collected this information for past 5 years, although same soil management had been sustaining for the past 25 years. Due to very complex and very large findings, it was not possible to publish everything in a single paper. This present paper is mainly focuses on description of spatial variations of some soil properties in two geological units. In this respect use of time series analysis would not increase quality of the paper.

11. P.4265, L.5. What is basis of selection of grid spacing (500 m)? Does similar variogram pattern can be replicated in another regular square grid (500x500m)?

Our response: The study area is large and working with square grid would result in



HESSD

8, C4029–C4033, 2011



large number of samples. Working with 500 x 500 m grids could result in a smaller number of samples, however, it would be possible to adequately model the behavior of semivariograms near the origin. That why we preferred irregular grid sampling. There are many published examples of this kind sampling applications in geostatistical studies.

---

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