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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.

Anonymous Referee #3

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There is an interesting work in this manuscript analyzing spatial variation of soil physical properties using geostatistical method. My critique of this paper focuses on three major topics: 1) the suitability of the statistical analysis for the type of data; 2) the lack of methodological description and interpretation provided by the authors; and 3) the incomplete discussion provided for some parameters. The results and discussion sections are organized poorly and need strong revision. Further, this article needs strong revision in terms of presentation (Figures/Plots) and data analysis.

A major concern relates to the use of the statistical tools (i.e., geostatistics) to analyze

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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.

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.

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

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

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.

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

Figure 3, 4, 5: Again the legend values for Figure 4 are different for Clay and BD than Figure 3 and 5.

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?

Page 4265 lines 5: What is basis of selection of grid spacing (500 m)? Figure 2: Does

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similar variogram pattern can be replicated in another regular square grid (500×500 m)?

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