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Discussions

Interactive comment on "Spatial variability of soil properties and soil erodibility in the Alqueva dam watershed, Portugal" *by* V. Ferreira et al.

V. Ferreira et al.

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The authors thank the anonymous referee the comments about our manuscript. Some modifications, according to the comments, were made and the updated manuscript is attached as a supplement. Our answers to the comments are:

Comment 1: "The geospatial distribution of soil erosion is a key finding in this paper. Therefore it deserves more attention. First, the methods of the second author (Panagopoulos) in the papers from 2006 and 2014 are not detailed sufficiently and how they are adapted to this study case of different conditions." Answer 1: In the section 1.4 of the manuscript, we have detailed more the geostatistic methods used in this study. The geostatistics were used to obtain interpolation maps of soil variables from a limited number of samples and it was applied in ArcGIS, using the Geostatistical An-

alyst Tool. More detailed information about geostatistics methods selected (ordinary kriging) and the mechanisms (data transformation to normality, trend removal, cross-validation to select the semivariogram model and the creation of the interpolation map) were added to the new version of the manuscript.

Comment 2: "Second, the Biplot analysis and particularly the clustering are very interesting. However, reference to the visualization in Fig. 4 (or a similar visualization) should be described in part when describing the method." Answer 2: The process about the visualization analysis of HJ-Biplot graph (Fig.4) was better described in the chapter 1.5 Line 216 (methodology of Biplot).

Comment 3: "The connection to a complex network approach analysis in the clustering could be made. Also, how it is possible to connect this kind of visualization to a map? There are approaches in diagram science to map complex networks" Answer 3: HJ-biplot, additionally to the analysis of soil properties and sample correlations, allows the identification of specific sample groups (clusters) according to the similarity (in term of soil properties). The both biplot analysis ensure a better understanding of the effects of land-uses and specific practices on these soil properties. The combination with geostatistics (spatial distribution) allow these knowledge derived from clustering to be found in space. Therefore, it's possible to know the specific location where some management practice can be applied and how it changes some soil variables, reducing the soil erodibility and consequently soil erosion. In that specific case of our research, the obtained clusters correspond to the different land uses. However, clustering process can identify areas with similar soil properties where similar land-management should be applied. A paragraph was written on the results and discussion section (line 397) to discuss the application of clusters analysis in soil management, which has important theoretical and practical significance for precision agriculture. At the conclusion (line 419-427), it was explained how the connection between the HJ-Biplot approach and geostatistics (maps) can be useful for a better land management in the Alqueva area (see attached supplement file).

Please also note the supplement to this comment:
http://www.solid-earth-discuss.net/7/C139/2015/sed-7-C139-2015-supplement.pdf

C141