

Interactive comment on “Impacts of land use and topography on soil organic carbon in a Mediterranean landscape (north-western Tunisia)” by Donia Jendoubi et al.

Anonymous Referee #2

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Soil-2019-15 is an interesting study which presents the combined effect of land use and topography on soil organic carbon (SOC) by comparing SOC data under four land uses and three slope categories and two aspects in north-western Tunisia. This paper contributes to build a soil spectral database of the studied watershed as a tool to study SOC variability. Although the consistent soil sampling collection and laboratory work, **there is a lack of detailed information about materials and methods (soil type, soil spectral collection, model spectrometer, partial least-square regression) and the statistical analysis can be improved (data normality, analyze the interaction effect between topographic parameters and land use, MANOVA).** In my opinion, some major aspects should be addressed before the acceptance of the manuscript for publication. The text

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should be revised to improve the grammar and readability.

Line 13 “SOC levels” content should be more appropriate to refer the percentage of SOC in a soil sample. **Please revise in the whole manuscript. See line 74. Keywords: “landscape” is too general** Line 26 **Human activities are responsible for ... that exacerbates soil erosion. Please include a reference.** Line 32 “Soil degradation is a key component of land degradation in the Mediterranean region” a similar sentence was included in line 25 “**Land degradation, and especially soil degradation, is a major challenge for Mediterranean**” Lines 37-41 could **be move before line 32** Lines 42-45 **can be moved to line 26 after ecosystems** Line 45 OM should be defined Soil organic matter similarly **SOC in line 52** Line 51 “Some soil biological degradation types were caused by agricultural practices” **should be linked** with “Soil degradation processes include biological degradation” in line 42 Line 52 **Please include a reference also** in lines 59 and 65 Line 54 **remove “of OM”** Line 60 a sign of Line 61 Soil from the study area Line 62 carbonate sedimentary **parent material?** Lines 63 – 67 This paragraph refers to **Tunisia? It is unclear in the present form.** Line 73 **“systems” can be removed;** Revise the use of landform that refers to slope and aspect (see line 340). Landform is more than derived topographic variables, **it implies geomorphic processes.** Similarly in line 77 environmental factors to refer slope and aspect. Line 75 The aim of this study is to quantify SOC content and evaluate the factors that **affect the SOC variation,** specifically, ... Line 81 In the introduction the problem statement can be related to Wadi Beja watershed; **Authors should list the soil degradation problems** in this area or why this watershed was selected to link with the research question (See lines 104 – 107; 111 - 114). Apart from the lack of soil database Line 100 m **a.s.l** Line 111 **conserved?** Line 139 What soil types? **A description of the soil type** or a map should be included. Line 142 **Define LUC.** Include the **abbreviation in line 141.** Please revise in line 152 **LUS or LUC.** Use the same abbreviation in the whole manuscript. Line 145 **flat, moderate and steep** **A figure to illustrate the location of sampling units and sampling collection strategy (Lines 153-156) is needed.** Also derived land use maps from Landsat in 1985, 2002 and 2016 could be included. **Table 2 Slope (%) “categories” can be removed**

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Line 159-163 Move to introduction. Authors should put in value the novelty of male the first soil library. Line 164 "All samples were taken for spectroscopy analysis in the laboratory." This sentence is unclear. Line 170 Determination of SOC. Please explain in detail SOC determination by dry combustion? Line 181 before applying ANOVA test, data normality should be verified. Lines 187-189 move to Materials and methods. Results some of the sampling points have been affected by land use changes? Authors can consider using a multivariate ANOVA. In the results section, authors included references (see lines 215, 217) to interpret the results. Please revise and move these parts to Discussion Lines 215 and 217. Delete the brackets. Discussion Authors focused in land management strategies. However there is a lack of discussion regarding the impact of land use changes on SOC in the study watershed. Lines 283 – 286 This paragraph seem disconnected. Conclusions should be shortened. Lines 439-443 move to discussion.

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