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Interactive comment on "Ecological soil quality affected by land use and management on semi-arid Crete" *by* J. P. van Leeuwen et al.

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Dear reviewer,

Thank you very much for providing valuable and helpful comments on our manuscript. We have used your comments to revise and improve our manuscript in several aspects. Below we describe how we addressed your comments in the revised version of the manuscript.

A main comment, appearing in all three reviews regarded the many differences among the sites, and the lack of true replication that hamper specific conclusions about specific site-characteristics, especially land management. In our original manuscript we already have recognized this limitation of our study, but based on the comments by the

reviewers we now more accurately addressed this limitation in terms of the research aims, and hence the title of our manuscript. We followed your suggestion and changed the title into: "Biological soil properties under different land management types on semi-arid Crete", implying that we treat 'land management' just like other differences among the sites. In the new manuscript we have consistently revised the text accordingly.

Most other comments were also highly appreciated and could satisfactorily be addressed in the new manuscript.

Below we will react on all points raised and describe how we have addressed them in the new manuscript. We have printed your comments point-by-point together with our response.

Comment-1: The content of the paper is interesting and deals with an important topic, the quality of soils with different land use and management in semiarid zone; investigations reported on this subject with such a range of soil properties, particularly microbes and fauna, are very scarce. However, I consider that it should be revised carefully, rewritten and modified before publication.

Comment-2: I have serious doubts about if the experimental set up is adequate to fulfill the objectives of present study and hence to evaluate the effect of land use and management on ecological soil quality. As it is indicated in Table 1 and in the text, soils differ in elevation, climatic conditions and parent material; therefore, the effect of land use can't be properly determined. This is confirmed with data of some soil properties such as texture, CaCO3, pH and organic matter, which varied among soils (Table 2), indicating that different soil types were considered for evaluating the effect of land use and management. It should be noticed also that biological properties exhibited a high inter- and intra- soil variation (seasonal, spatial) and hence measurements performed once in these three sites showed very limited information on the ms topic. My recommendation is to redefine the aims of the paper, which should be less ambitious and more realist and focused on the innovative aspects of the study (biological properties

in semiarid soils with different management), and to analyze the data in more detail with this new perspective and to rewrite the ms.

Response-2: We agree. Also the other reviewers mentioned this point. See our general response above at the start of this author comment.

Comment-3: Title, it should be changed reflecting the content of the paper.

Response-3: Title is changed into: “Biological soil properties under different land management on semi-arid Crete”. (see also our general response above at the start of this author comment)

Comment-4: Introduction: the objective, which is very ambitious, should be redefined in a more realistic way and the introduction should be addressed more specifically to the subject and aims of the paper.

Response-4: We agree: In the introduction the first sentence is removed and more attention is given to the Mediterranean region (page 189, lines 1-10). The aim has been changed into “to investigate biological soil properties under different land management at the Koiliaris CZO sites in Crete (Greece) that are considered to be at risk of potential soil degradation and desertification.”

Comment-5: Material and methods, only three soil samples collected at one sampling time are analyzed. Since soil samples differ notably in organic matter content and biological variables are closely related to this soil property, values of biological parameters should be expressed in relative values (as percentage of organic C) in order to facilitate comparison of the estimates in sites with different management.

Response-5: We are aware of the differences in organic matter between the sampled sites and that soil biological parameters can be strongly related to organic matter contents. However, in the present case we have chosen to present absolute values for all biological parameters, because this is commonly done when these measurements are used as indicators for soil quality.

Comment-6: Likewise, data should be interpreted with caution since only three sites were sampled and relationships between variables are very weak, since only three points for correlations. Mean values of three sites should be used, replicates (n=9?) should not be used.

Response-6: We completely agree. All tables show the means of all parameters, together with the standard deviations as a measure of variation between replicates and the correlations in the revised manuscript are based on means of the three replicates per site (n=3), not of individual replicates (n=9).

Comment-7: Data should be interpreted with caution and limitations of the experimental set up should be considered (it is not possible to analyze properly the effect of land use and management, few data to extrapolate the evaluation the soil quality of southern European as well as the usefulness of soil quality parameters etc.). Discussion should be less speculative and focused mainly on data here obtained with the scarce number of samples (only 3 sites collected at one sampling time).

Response-7: We agree. Also the other reviewers mentioned this point. See our general response at the start of this author comment.

Comment-8: To sum up I also consider that ms should be rewritten before publication after a detailed analysis of data taking into account the limitations of the experimental set up (see above comments).

Response-8: We agreed with the comments put forward by the reviewer and have tried to address the comments in the revised manuscript.

Interactive comment on SOIL Discuss., 2, 187, 2015.