SOIL Discuss., 1, C109–C111, 2014
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SOIL Discussions
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Interactive comment on "Organic carbon, water repellency and soil stability to slaking under different crops and managements: a case study at aggregate and intra-aggregate scales" *by* A. Jordán et al.

Anonymous Referee #2

Received and published: 30 September 2014

This work presents a very interesting study focusing on the distribution of organic C and water repellency in soil aggregates and its relation to slaking. This research concentrates on soils under different soil management including conventional and conservational tillage with mulching. The study is not very novel in terms of the approach and the techniques as similar studies have been previously conducted, however, the originality of the paper lies in the application of these peeling methods to soils in Mediterranean region. The study presents potentially interesting results, however, at the current stage is not at the sufficient standard to accept for publication. Clear identification why this

study is important has not been provided, the methodology is not complete and requires further clarification. The presentation of results and discussion needs substantial improvement. Proof reading of the native English speaker would benefit the paper as currently there are some language problems which may hinder understanding of the presented work. Detailed comments and suggestions are provided below. Introduction lacks a flow in the text and different parts of introduction are not well linked. It would be good to include some references how the agricultural soil disturbance affect soil water repellency. It is not clearly explained why the research conducted here is important and what kind of implications the findings will have. Some very recent papers related to soil aggregate C distribution and stability of aggregates are not included but maybe relevant for that work. Urbanek, E., Smucker, A., Horn, R., 2011. Total and fresh organic carbon distribution in aggregate size classes and single aggregate regions using natural 13C/12C tracer Geoderma, 164, 164-171 Emilia Urbanek , Rainer Horn, Alwin J.M. Smucker, 2014 in press. Tensile and erosive strength of soil macro-aggregates from soils under different management system. Journal of Hydrology and Hydromechanics. Vol. 62, No. In Press, 2014, p. 1 - 10 , doi: 10.2478/johh-2014-0034 Methodology. This section needs significant improvements. Please provide information for how long the mulching and conservational tillage has been applied on the site. What is the sampling depth, what are the field moist conditions, provide values, describe how soil aggregates were separated (manually?) and how the aggregates were separated to different size classes. It is described that aggregates were measured and separated to different size classes to determine WR and OC content. How exactly was WR measured? Was it conducted on single aggregates or number of aggregates? The choice of the WR measurement has not been justified and the choice is very surprising. There are several methods of WR measurements and EPD is probably the least sensitive for the low levels of SWR. Provide explanation why only 10-15mm aggregates were selected for peeling, and why 10mm aggregates were selected for slaking, the choice seems very random and it is not clear why different sizes were chosen for different measurements. Please provide more details about the erosion chambers the diameter of the

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chamber in relation to soil aggregate size would be a useful information. Was water repellency assessed on the peeled material? It is not clear how this has been done. Results section needs some language corrections as at the moment many sentences are not appropriately constructed. Due to lack of clear explanation of applied methods it is very hard to assess the results, especially the water repellency. I have very much doubts about validity of correlations different soil properties and slaking as it is unsure whether results from the same aggregate sizes have been used for the comparison. Discussion The main change in OC content in the samples was created by addition of organic matter with mulching and this aspect is not described or discussed. It is very interesting result that soil aggregates under mulching treatment are very different. The fact that during conventional tillage the soil aggregates are disturbed to a large extend should also be included as one of the reasons for much lower OC contents.

Interactive comment on SOIL Discuss., 1, 295, 2014.