

## ***Interactive comment on “Challenges of soil carbon sequestration in NENA Region” by Talal Darwish et al.***

### **Anonymous Referee #2**

Received and published: 6 March 2018

This paper addresses a very important topic for soil degradation and food security. This topic could potentially interest a wide audience readership and is well suited to the journal 'SOIL'.

However I have several concerns about the paper, which I explain below.

I was rather disappointed by the method used by the authors, which is basically populating large soil map units with mean values taken from profiles. I'm not sure at all it is relevant and new to do so. I would have expected that at least climate data and land use data are added to the dominant soil type information to do this exercise. I know of course that from a very global point of view, soil types and climate are related but this is not always the case (e.g. you can find rendzinas, fluvisols, cambisols, lithosols, arenosols, etc. in nearly all parts of the World). I'm also disappointed by the fact that

the authors do not integrate land-use in their mapping, though they show it has a major effect. This seems to me contradictory.

I would have expected a more novel approach in mapping such as the use of Digital Soil Mapping. By the way, there have several attempts to map SOC at the global scale and the authors seem to ignore them (e.g. maps from Stockmann et al; Hengl et al; and the recent exercise under the umbrella of the FAO). I would at least compare the results from this study with previous ones in a discussion part.

There is quite no discussion about uncertainty, no error bars or box-plots in results, and this is a serious concern. Validation against Lebanon may induce a serious bias as Lebanon soils have been much more known and investigated for a very long time than soils from some other countries. Subsequently it may be that the DSMW is much more precise in Lebanon than in other regions.

The Mat&Meth section is not enough detailed. We don't know how many profiles were used (a 'large number'), how many per soil type, if they were georeferenced or not and, if so, with which accuracy, when these profiles were taken (they might be no more representative of SOC stocks if they were taken 50 years ago).

We also do not know how the calculations by land use were done. By a geographical way, or by extracting soil use classes from the DSMW? There is also here a question of matching observations both in space and time.

Finally the general discussion about the challenges is rather interesting but quite fully disconnected from the results.

More detailed comments

The legend of Fig 2 is unclear (Mega ton on which area?)

The threshold of 30 tons is highly questionable

There is twice the same sentence lines 90-92 and lines 101-103.

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There is a problem with the labelling of countries (Fig. 5 top) Abstract first word should be Near and not North

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Interactive comment on SOIL Discuss., <https://doi.org/10.5194/soil-2017-39>, 2018.

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