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Comment

Interactive comment on “No-tillage lessens soil CO₂ emissions the most under arid and sandy soil conditions: results from a meta-analysis” by K. Abdalla et al.

Anonymous Referee #1

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1. General comments While the paper is about an exciting and important subject, there are significant grammatical errors that require serious attention. It is understandable that many authors are not native speakers of the English language, but effort should be taken to have manuscripts edited by people with a good grasp of the language. There is also a lack of consistence in the style or structure of the discussion section. The author started off with short discussions under attribute based sub-topics and drifted to one long discussion where a number of attributes were lumped together. The danger in adopting the approach of the short discussions under specific sub-topics based on attributes is the interactions between/among the attributes e.g. the impact of most of the attributes analysed depend on length of time under adoption, climate, soil texture

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etc. It is often difficult to treat these factors independently in a discussion. Some results are poorly discussed e.g. the impact of (i) crop rotations, and (ii) nitrogen fertilizer application on SOCC and CO₂ emission. There is no depth in the discussions and one wonders if the efforts in analysing the impact of these attributes were worthwhile.

2. Specific comments Pg. 15497 l. 9:been 'a' common practice in agriculture

Pg. 15497 l. 13:may also lead to the 'vertical and' lateral export

Pg. 15497 l. 9-20: Why starting a new paragraph? Moreover, lines 16-19 make a very small paragraph.

Pg. 15497 l. 21: ..., exposing 'the' protected

Pg. 15498 l. 6: suppress 'The' to start the sentence as 'Common wisdom is...'

Pg. 15498 l. 11: suppress 'the' for the sentence to read '...reported that abandonment...'

Pg. 15498 l. 14: put a full-stop (period) to end the sentence '.....compared to tillage.'

Pg. 15498 l. 16 suppress 'under' for the sentence to read '... under no-tillage than tillage'.

Pg. 15498 l. 17: suppress 'a' for the sentence to start 'While consensus...'

Pg. 15498 l. 25: add 'depth' for the sentence to read '...soil sampling depth extended to...'

Pg. 15499 l. 1: suppress 'from' for the sentence to read '.....under tillage than a no-tillage...'

Pg. 15499 l. 8: format 'in situ' to italics because it is not an English word.

Pg. 15499 l. 9: '...similar to those from tilled soils'.... suppress 'which were tilled'...

Pg. 15499 l. 14: space required 'China,no-tillage'.....

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Pg. 15499 l. 16-18: poor grammar in this sentence. I also think this sentence is not adding any value and must be suppressed.

Pg. 15499 l. 19: 'soil compared to tilled soil to increased decomposition'.....

Pg. 15500 l. 2: 'on the CO2 efflux'.....

Pg. 15500 l. 24: format 'in situ' to italics

Pg. 15500 l. 25: avoid starting a new sentence by 'To'....

Pg. 15501 l. 13-15: the sentence is not clear. It is not normal to start a new sentence with the word 'For'. Therefore, it is suggested that the sentence be rephrased.

Pg. 15501 l. 20: suppress 's' and 'of' for the sentence to read 'and average CO2'...

Pg. 15501 l. 22: suppress 'that' and use a better word in place of 'made'

Pg. 15501 l. 23: suppress the comma (,) after SOCC

Pg. 15501 l. 24: suppress 'the' after 'In addition',

Pg. 15501 l. 27: suppress comma (,) after management

Pg. 15502 l. 3: add 'in terms of' after 'gave SOCC',

Pg. 15502 l. 4: do not start a sentence using the word 'For'

Pg. 15502 l. 5-7: Who used the formula to estimate SOCC? If the formula was used by papers used for the review, then there might be no need to present it here. However, the formula has to be mentioned together with the reference.

Pg. 15502 l. 23: do not start a sentence using the word 'For'

Pg. 15503 l. 2: use a plural for crop (i.e. crops)

Pg. 15503 l. 6: suppress 'the' for the sentence to read 'As a common practice, natural'...

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Pg. 15503 l. 17: suppress 'the' so as to read 'Overall, average'...

Pg. 15503 l. 18-19: replace 'for those under' by 'from'...

Pg. 15503 l. 21: suppress 'and was'

Pg. 15504 l. 1: suppress 'and was'

Pg. 15504 l. 5: do not start a new sentence by the word 'For'

Pg. 15504 l. 24: suppress 'the' so that it reads ... 'abandonment on one hand and selected'...

Pg. 15504 l. 6-8: 'However, ... climates' is not clear. Do you mean CO2 emission from till and no-till soils were not significantly different in each of the two climatic zones, or there were no significant differences between the two climates?

Pg. 15504 l. 11: suppress 'under' and 'for'

Pg. 15504 l. 12: not clear whether statement refers to SOCC between till and no-till in each for each climate or are comparing between the two climates. Rephrase this part to make it clearer.

Pg. 15504 l. 15: suppress 'soil organic carbon content' because SOCC has already been used countless times before

Pg. 15505 l. 4: insert a comma (,) after 'soils'

Pg. 15505 l. 5-6: not clear, otherwise the sentence appears to add no value at all

Pg. 15505 l. 12: 'and untilled soils'. Suppress 'positive'

Pg. 15505 l. 17: do not start a new sentence by the word 'For'

Pg. 15505 l. 18: change 'is' to 'was'

Pg. 15505 l. 19: suppress 'negative'

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Pg. 15505 l. 25: suppress the comma (,) and replace 'but a' with 'and' and then suppress 'difference' and 'lasting' on pg. 15506 l. 1.

Pg. 15506 l. 1: suppress 'In the meantime'

Pg. 15506 l. 4: replace 'lower' by 'shorter'

Pg. 15506 l. 6-11: Why is there is no result comparing SOCC under till and no-till soils? Was it not important?

Pg. 15506 l. 16: was the difference of 18% significant?

Pg. 15506 l. 17: 'and only 5% lower when'...

Pg. 15506 l. 18: 'Soils under a crop rotation regime exhibited much'...

Pg. 15507 l. 4: 'Axis 1 could, therefore, be'...

Pg. 15507 l. 9-10: what are 'cool sandy and dense soils' and 'warm clayey'...? Are they 'sandy and dense soils under cool climates' and 'clayey soils under warm climates'..?

Pg. 15507 l. 13:impact 'on' decreasing...

Pg. 15507 l. 14-16: suppress the second 'in' and 'from' so that it reads 'with 10% lower SOCC in tilled than untilled soils and 21% greater CO₂ emission from tilled than untilled soils'. You may also need to consider rephrasing this part so that you avoid repeating 'tilled and untilled soils'.

Pg. 15507 l. 21: suppress the second 'under' so that it reads 'greater CO₂ emission under tillage than no-tillage'... Moreover, l. 20-25 need to show the contrasts in SOCC and CO₂ from the different authors cited. You assume, in the present lines, that a contrast in SOCC and CO₂ emission automatically mean a contrast in CO₂ emissions under the different tillage practices. Is this always the case? I think other factors limit this assumption. Therefore, it is important to compare the contrasts in

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CO₂, and then the contrasts in SOCC!

Pg. 15508 l.1: suppress the first 'the' so that it reads 'moisture content and amount'...

Pg. 15508 l. 9-12: I suggest 'At humid sites, high soil moisture favour high decomposition rates resulting in little differences between tilled and untilled soils, while large differences develop in arid climates with much lower soil water content (Fortin et al.,...)'...

Pg. 15509 l. 6: 'soil aggregates within the top-soil'.....

Pg. 15509 l. 11-19: why is the impact of soil texture on SOCC not discussed? Was it not an important result?

Pg. 15510 l. 6: 'less than 10 years old'.

Pg. 15510 l. 7: suppress 's' to read 'no-tillage lead to carbon'... why were there carbon losses in the first years? You probably need to explain this in brief.

Pg. 15510 l. 12: below 0.1 m? Is 0.1 m a measure of soil carbon? Again, there is probably need to explain why the soil carbon decreases in long-term no-till as suggested/indicated by the sentence.

Pg. 15510 l. 13: another attribute is now being discussed i.e. crop residue management! There is need for consistence in how the discussion is structured. If authors decided to use short discussions with sub-headings, so be it and they need to stick to that style.

Pg. 15510 l. 26: suppress 'finding' to read 'also reported reduced soil'.....

Pg. 15511 l. 3-6: why this very short paragraph? I suggest this be made a part of the previous paragraph with an interchange of the 2 lines in this very short paragraph, as follows 'in CO₂ emissions. This result can, however, explained by the very low amount of carbon in crop residues compared to the bulk soil (Luca et al., 2010). However, our analysis seems to suggest that climate and SOCs are stronger controls

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of soil CO₂ emissions than the availability of crop residues'. . . Even when re-arranged like this, the statement . . . 'very low amount of carbon in crop residues compared to the bulk soil' require further clarification because one generally expects organic matter to contain a greater amount of carbon than soil!

Pg. 15511 l. 7: another case requiring consistence. It may also be difficult to understand a 'tilled fallow' unless this was for pure experimenting. There is, probably, need to improve this sentence to make it more meaningful.

Pg. 15511 l. 10: CO₂ 'emmission'??? This must be a wrong spelling.

Pg. 15511 l. 12: consistence required. I also find the discussion in this paragraph (l. 12-17) very limited and rather poor. Do the authors assume crop rotations are only possible in tilled systems only? One expects a comparison of crop rotation and monoculture impact on SOCC and CO₂ under tilled systems, and then a comparison of the same under no-till systems.

Pg. 15511 l. 18-23: should be merged with the previous paragraph, because both of them are related to the effect of crop rotation and/or monoculture.

Pg. 15511 l. 24: new attribute being discussed! L. 25: replace the period or full-stop (.) by a comma (,) to read . . . 'fertilizer level (Fig. 6a), a result'. . . .

Pg. 15511 l. 26: change 'These results' to 'This result'. . . L. 26-29: Are productivity and C inputs to the soil similar in tilled and untilled soils when nitrogen fertilizer is applied? I find the result poorly discussed. There is need for literature to support the argument.

Pg. 15512 l. 2: replace ':' by ';' so that it reads 'the opposite; a 14%'. . .

Pg. 15512 l. 10-11: suppress 'highly' and add 'more' to read 'are likely to be disaggregated more by tillage'. . . .

Pg. 15512 l. 13: replace 'this' by 'which' to read . . . 'aggregate dispersion, which

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explains'...

Pg. 15512 l. 14-16: sentence does not add any value here. I suggest (either) suppressing it (or taking it elsewhere)

Pg. 15512 l. 16-18: check grammar. I suggest 'It appears the cessation of tillage impact on CO₂ emission is not controlled by surface mulch limiting the contact between fresh dead organic material and the soil matrix and soil organisms'. However, I still do not understand how the mulch limits the contact between organic material, soil matrix and soil organisms because the mulch itself is often of organic nature; unless the authors are talking about other special mulching materials (e.g. plastics). This may need to be stated explicitly, otherwise common knowledge is to use crop residues for mulching.

Pg. 15512 l. 25: suppress 'and' to read 'inputs (from observation sites) used' . . .

Pg. 15513 l. 1: either suppress or replace 'this' by 'the'

Pg. 15513 l. 13: add 'more' to read '. . . . 'activity more under' . . .

Pg. 15513 l. 13-15: why a paragraph? Moreover, the last part of the sentence after the comma does not seem to add any value here.

Pg. 15513 l. 16-20: this information is misplaced. One cannot expect this in a conclusions section. Please, can you find 'a home' for this in your discussion section or just suppress it.

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