RESPONSE TO REVIEWER' S COMMENTS (*first round of revision***)**

Dear Reviewer,
We thank you for your comments and detailed examination of our paper. All your comments have been included and corrected in the text of the paper. The explanation is proposed in the text below. We thank for the comments from the reviewer that have contributed to improve the quality of our paper and to eliminate mistakes.

Authors

Reviewer #2 (Professor Peter Matthews):

While I was writing this review, Paul Hallett's was posted. So I have also read Hallett's general comments, and agree with them. So this review should be regarded as additive and complementary to Hallett's.
The work addresses an important topic, reports on a very considerable amount of research effort, and could be very useful. However, it could only be published following a major re-write, and even then could only be published if all our very major concerns are satisfied. The comments below should not be regarded as comprehensive and complete – they are just representative and illustrative of the very great amount of extra work that is needed in the presentation of this potentially interesting and worthwhile work before it is published. That extra work should start with addressing the major issues of explanation of rationale, methodology, statistics and results, and finish with word-by-word proof-reading – with regard to the latter, the individual corrections listed below illustrate the type of corrections needed.
Firstly – overall – although 'wetting agents added to agricultural sprays' is mentioned in the title, it is not clear from the abstract that that is what the paper is about. We have to read a long way into the text before re-discovering that. Stand back and think – what would be the usefulness of this research ? Answer – if a particular wetting agent causes particular loss of soil stability, then perhaps it should be changed to a different one. So – in a typical application to a crop – how much of the wetting agent falls onto the soil rather than being absorbed by the plants ? Does that order of magnitude correspond to the application you have studied ? (These issues are deferred to suggested further work late in the submission.) And the soil erosion is presumably caused by rainfall dislodging the surface layer of the soil and washing it down-hill. So - how exactly did you measure the soil stability – and why such deep soil pits (annex b-4) ? Do the wetting agents really penetrate that far to cause reduction in stability? And I would like to know what soil type is most affected – but find it almost impossible to judge that from the way the results are presented.

Response - Thank you for your comments and for the general evaluation of our paper. We agree with your comments and proposed changes. We have tried to take into account all comments, both yours and those of the other reviewer prof. Paul Hallet, and we have modified the whole paper from Abstract to Conclusions. Our goal has been to add concrete data and conclusions to Abstract, to simplify Introduction, to add necessary information to Material and Methods (dosage of wetting agents, topsoil characterization, more details on statistical data processing etc.), and to delete redundant text from the chapter of Material and Methods. We have also completely changed the structure of Results and reworked Discussion.
As to your question about the research usefulness, we primarily dealt with the issue of a potential influence of wetting agents application on the stability of soil aggregates in the top soil. Characterization of soil pits was added as the pedological survey was part of soil sampling. We wanted to know all essential data about the soils. We agree with you that the description of all soil horizons should not be in the chapter of Methods but in the Annex. In Methods, we have left only the

characterization of top soil layer from which soil samples were collected. The soil samples were collected from regions in the Czech Republic that feature different reliefs and are potentially prone to various forms of soil erosion. Yes, climatic conditions are an important aspect but management practices on these sites play a role, too. Nevertheless, impacts of erosion on the sites were not subject of our research.

Point 1 - Abstract:
Do not repeat the list of different types of wetting agents, but do tell us where wetting agents appear from. Invented acronyms not already accepted in frequent usage are irritating for the reader – so spell out SAS and WA. Ox should be subscript in the term Cox.

Response 1 – Thank you for your comment. The proposed changes have been made.

Point 2 - Introduction:
Needs to be more focussed, especially with regard to the references – cite fewer.

- Line 36 - missing ".
- Line 38. aggregate consists of -> aggregates comprise
- Line 47. Awkward grammar using the - symbol.
- Line 55. 'At that' – ambiguous phrase.
- Line 64. as cuticle of -> as the cuticles of
- Line 81 , 82. I am not familiar with the use of the term 'stand'.
- Table 1 . I do not understand 'sum of temperatures' – why add the temperatures together ?
- Line 285. 'EDTA' – explain.
- Line 292. 292 personal -> principal.

Response 2 – Thank you for your comments. The chapter of "Introduction" ¨has been altered to better reflect the main topic of the paper. The other grammer mistakes have been corrected in line with your suggestions.

- Line 36 – Missing quotes have been added.
- Line 38 – The sentence has been modified.
- Line 55 – The sentence has been modified.
- Line 64 – The sentence has been modified.
- Lines 81, 82 – We agree with your opinion. The term "stand" was replaced with "growth".
- Table 1 – We realize this is not a standard meteorological representation of temperatures. It is a mode used in agronomy (agriculture) to express whether the region is cold, warm, mildly warm or very warm region. The reason is a state when the period with a mean daily air temperature >10°C lasts in the Czech territory on average >140 days, thus representing the vegetation period. For example, the sum of temperatures above 10°C, which ranges from 2500–2800°C indicates the warm region (the highest number of vegetation days), while the interval from 2200-2400°C indicates the cold region (the lowest number of vegetation days) in terms of growing field crops. For better clarity, we have added units (°C) into the table.
- Line 285 – This was a mistake which has been fixed.
- Line 292 – Thank you for notification, a correction has been made.

Point 3 - Results:
You need to explain the rationale behind your statistical approach. What do the various methods, such as 'post-hoc Tukey's SD test' actually show you , and why did you choose that approach? I find

many of the results baffling. For example, in Figure 3, why are there four different graphs, and why are there two results for each sampling point?

- Line 412. Refers us to Figure 5 (before reference to Figure 4). But where is Figure 5 ?

Response 3 – Thank you for your comment, we believe that incorporating the proposed changes and explaining the statistical data processing will improve the manuscript quality.

- The whole chapter has been reworked so that the measured values are logically linked.
- Input data analysis has been performed first.
- This has been followed by ANOVA and the Tukey´s HSD test, which has been used to determine significance of differences between the control variant (without WA addition) and the variant with the addition of WA. First, all values have been compared with each other (Table 4 in the corrected manuscript) and then values from individual sites (Figure 2 in the corrected manuscript).
- ANOVA and the Tukey´s HSD test have been complemented with the pair T-test whose task has been to confirm that the sets of all WSA values (control versus variants WA1, WA2, WA3, WA4) exhibit significant differences. The pair t-test has been used to compare mean values of individual WA. Thus, values before and after the addition of WA have been compared.
- Graphical representation of the significance of WA application effect on WAS has been made with the use of box chart (which was designated as Figure 3 in the original text and moved into Annex c-9 in the corrected text). This graph presents a comparison of mean WSA values (median) in the control variant and in variants after the addition of WA (four wetting agents – four graphs) to soil samples from individual sampling points. In addition, the chart shows also average values, extreme values and outliers, thus providing an overview about the variability of measured values.
- Line 412 – Thank you for your comment. This was our mistake, the correct Figure designation has been added.

Point 4 - Discussion:

The discussion wanders around all the different factors – soil type, crop type, agricultural practice etc – but these should have been separated out as factors early on, and the statistical approach used to remove them as factors masking the deleterious effect of wetting agents. By the time we get to the discussion, we should know the effect of wetting agents on their own, independent of confounding factors – so that, for example, you could advise manufacturers of sprays to change wetting agent, or advise farmers of what soil types not to spray on. Similarly, from line 451 onwards, you start to describe the chemical make-up of the sprays – but again that should have been described early on.

- Line 491 onwards. This is a 'further work' section, not part of the discussion, The problem is that many of the shortcomings of this work are stated as needing further work, but should have been sorted out in this study. Overall, there are too many citations, and the various discussions ramble rather than being compartmentalized into the various issues, each of which should be tightly focused on.

Response 4 – Thank you for your comment. The whole chapter of discussion has been reworked. We have tried to take into account your and Prof. Paul Hallet´s comments.

- Line 491 onwards – We agree that the discussion was not homogeneous and that some included issues could have been better discussed and/or explained. On the other hand, we would like to point out that our goal was not to describe for example the chemism of the action of wetting agents on soil particles in detail or to analyse their concrete influence on the development of soil erosion. Our goal was to open a research and discussion to the issue that

has been investigated only partly up to now. There are extensive studies on the effect of the application of various pesticides on living ecosystems but the influence of additives in spray mixtures has not beed studied in detail. We did not want a broad research concept at the beginning but we rather wanted to focus on a basic question: "Is there any potential that soil aggregates can be affected by wetting agents?", the answer to which would then continue with a follow-up research that would be conducted either directly by our team or by colleagus from other universities.

Point 5 - Annex:
occasionally baffling. For example in annex a- and a-2 – what is the 'decomposition of the effective hypothesis', and why is 'soil horizon' a vertical label (with no tick mark) in Annex a-1, but a horizontal label in a-2 ? And annex d-8 is incomprehensible without further explanation adjacent to the figure.

Response 5 – Thank you for your comment. Annexes have been altered based on your recommendations. The first two graphs (Annexes a-1, a-2) show: a) the influence of sampling point within individual companies; b) within all companies. Average values of WSA (water stability of soil aggregates) are presented before and after the addition of WA. Soil samples were collected on each site from the top soil at two places. There were altogether 6 samples collected from one soil profile. The results show that average WSA values from one soil profile did not significantly differ whether they were compared within one company or for all companies together.

The authors hope that the revised version of the above manuscript no. SOIL-2021-91 will be accepted for publication in SOIL.

Yours Faithfully,

Dr. Jakub Elbl