

REVIEWER1

General comments

Authors:

thank you for your positive overall evaluation of our manuscript

Specific comments

Referee:

2 Study area and sites section. Since the authors collected samples in a variety of situations, a table summarizing the number, size, substrate, cover, treatment or not and type (unbounded or bounded) of plots would be welcome

Authors:

we agree that the suggested table would be useful and we will add it to the revised version of the paper.

Referee:

3.2 Laboratory analysis of runoff samples Line 10. Please clarify here the meaning of "normalized"

Authors:

We will rephrase this sentence, in the revised version, to clarify that normalization was done by dividing the signal measured for a runoff sample by the reference signal measured previously for bi-distilled water (see pg 455, lines 3-7).

Referee:

4 Results and discussion Maybe the authors can simplify the first paragraphs of the subsections 4.1.1, 4.1.2, and 4.2.1 and 4.2.2, simply with a comparison of the respective populations by a non parametric test. This would also reinforce the statements they do, when comparing in fact the respective medians. Maybe part of the variability detected could be a consequence of different levels of fire severity and could be convenient to mention it in the discussion.

Authors:

We have some doubts as to whether the different medians are statistically significant, due to the generally large range of values for each data set, but we agree that statistical test results could be helpful to simplify the first paragraphs of subsections 4.1.1, 4.1.2, and 4.2.1 and 4.2.2, and we will therefore carry out such tests for the revised version of the paper. We don't believe that the difference in median sediment concentrations are related to fire severity, as fire severity was similar at all study sites, but we agree that the revised paper should refer the possible role of fire severity in the between-site differences.

REVIEWER2

General comments

Referee:

The paper studies the impact of fire on soil erosion processes, focusing on sediment concentrations in runoff flow and streamflow samples at different scales, considering different erosion control treatments. Results are relevant and the objective falls within the scope of SOIL. The paper introduces the use of a novel device, a plastic optical fiber turbidity sensor, which is a new innovative tool for the study of sediment transport between soil and water bodies. Although turbidity sensors have long been used, the technique proposed in this study makes the experimental design more simple and the study much more relevant in a broad context. In my opinion, the study addresses soil problem within a multidisciplinary context and this is beneficial for SOIL, not only because of the introduction of new methodologies, but the study of soil processes in connection with other compartments of the ecosystem.

Authors:

Thank you for your positive overall appreciation of our work

Referee:

Although objectives are clearly exposed (page 452, lines 3-15), I have some concerns. My ask is: do authors want to test a new (interesting) tool so that they design an experiment or do authors want to study a problem using a new innovative tool? From the text, it looks the first option, but should be the second one. This problem affects the abstract partially and the title, which I strongly encourage to change.

Authors:

In answer to your question, we wanted to test a new tool and used an ongoing field study to do so. However, we can agree that it could have been equally valid and, possibly even more interesting, to study post-fire soil erosion using our tool, comparing the erosion estimates obtained with the tool with those obtained with classical laboratory methods. Nevertheless, the sample sets that were analysed with the sensor did not cover all the runoff samples that were collected at a study site during a complete study period and, in particular, the first year after the fire. Therefore, we will duly consider a follow-up study comparing erosion estimates based on our sensor and on classical laboratory methods.

Referee:

The experimental design and scientific methods are valid, although I miss some more details. In general, section 3 needs a subsection titled "Experimental design". Some sentences are not acceptable (see page 454, lines 11-13) and need a more detailed description (see detailed comments). In general, section 3 is wordy and some parts difficult to understand.

Authors:

As requested by the referee, in the revised ms we will substitute the sentence on lines 11-13 on pg 454 and add further details on the experimental set-up and on field data and sample collection. Furthermore, we will revise the wording of section 3 carefully and try to simplify parts that may be difficult to understand.

Referee:

Authors have chosen to combine “results” and “discussion” in one section. This is not my favorite option, but I find that the final result is very good in some cases, not so in others. I mean: only three references in section 4.1.2; only two in 4.2.1; only one in 4.2.2; only one in 4.3. So, discussion, in my opinion, needs more support and a deeper review of previous literature.

Authors:

We can agree with the referee that the combination of results and discussion into a single section is often a question of taste. Nevertheless, we strongly feel that combining them is the preferred option, as by the very nature of this study the discussion is strongly focussed on the results of this specific work. In other words, comparison with similar studies is typically of limited interest as these concern other samples as well as other sensors. This also explains the, admittedly, limited number of references in the referred sections.

Referee:

Conclusions are correctly enounced, although I suggest grouping them in a paragraph, not

Authors:

As in the case of the previous comment, we believe that the presentation of conclusions in the format of a list or in the format of running text is very much a question of personal taste. Since the other referees have not objected to the current format, we prefer to leave this section of the ms as it is.

Referee:

All figures and tables are useful and necessary, although I have observed some formal deficiencies. Most of them concerning the use of capital letters, abbreviations (eg, “om” instead of “OM”) and their meaning (organic matter, not defined in the caption nor in the main text).

Authors:

Thanks for pointing out some formal deficiencies in the figures and tables, which we will be glad to correct in the revised ms

Detailed comments

Please see supplement

REVIEWER2-supplement

Detailed comments

Referee:

Pg 451, L 4

Substitute “there remain important research gaps” with “important research gaps exist”.

Authors:

Ok, we will make the requested change in the revised ms

Referee:

Pg 452, L 3

“Aimed” or “aims”? I think you talk about your own study, so “aims”.

Authors:

Since we have opted for using, whenever possible, the past tense throughout the ms, we prefer to maintain “aimed”

Referee:

Pg 452, L 6

Re-write: “wants to”.

Authors:

Since we have opted for using, whenever possible, the past tense throughout the ms, we prefer to maintain “wanted to”

Referee:

Pg 453, L 8-10

Soil texture determined in the field or by feel method? Did the Authors did the test? I think this statement is not necessary and should be removed?

Authors:

We meant to say that soil texture was determined by the feel method. We prefer not to remove this part of the sentence as the feel method is coarser than the standard laboratory method.

Referee:

Pg 453, L 14-19

This paragraph should be moved to methods.

What is the location of study sites (add exact individual coordinates if possible)?

What is the distance between them?

What is the slope and aspect?

What is the age of the unburnt eucalypt plantation, independently of the period without fires?

Is the study catchment in the burnt area one of the previous sites, does it include some of them or completely independent?

Authors:

We believe that this paragraph suits best in the current section, especially since it is entitled “study area and sites”.

We will add the coordinates to the revised ms, in particular to the overview table of the study sites that Referee 1 requested.

We believe that it rather cumbersome to present the distances for all the combinations of sites; furthermore, these distances can be easily derived by the reader from the scale in Figure 1.

We did not add the expositions, slope angles and a rough indication of plantation age to the overview table of the study sites that Referee 1 requested, as there was no enough and we found these variables to be less important than those that could be added to the table

We believe that Figure 1 clearly shows which of the study sites are located within the experimental catchment; furthermore, we have indicate on line 18 that the catchment was located within the burnt area.

Referee:

Pg 453, L 23

What is “ca”?

Authors:

We will substitute ca. by “approximately” to avoid confusion.

Referee:

Pg 454, L 3

Re-write: "Polyacrylamide has" or "Polyacrylamides have".

Authors:

We will correct this mistake.

Referee:

Pg 454, L 11

Re-write: "instrumentation was completed".

Authors:

We believe that the correct tense is indeed "had been".

Referee:

Pg 454, L 11-13

This is not acceptable: has the reader to find and read four articles to know all details of experimental set-ups? Please, provide all relevant details here, including these citations if you like.

Authors:

We believe that the current description contains most of the relevant details and that the referred sentence is indeed a bit over the top. Therefore, we will carefully review which further details need to be added to the revised ms and refer to the other publications in another manner.

Referee:

Pg 454, L 18

How many samples per site/catchment (if any)? Not clear in the previous text.

What are the sampling dates ("the first year after the wildfire" is not enough).

What is the S site (OK, in the figure, but not mentioned previously in the text)?

Authors:

Also in line with the suggestion of Referee 1, we will add a table to the revised version of the paper that summarizes site characteristics as well as number of samples, exact sampling period. We will further clarify in the revised text what site S stands for, by referring the site codes in the last paragraph of section 2 and specifically mentioning site S.

Referee:

Pg 454, L 24

Re-write: "filter paper".

Authors:

As suggested, we will rewrite "paper filters" to "filter paper" in the revised ms.

Referee:

Pg 454, L 25

Previously dry or field moist? May look obvious, but it is not.

Authors:

We are not sure if we understand the question as the filter paper in question was not employed in the field but in the laboratory.

Referee:

Pg 456, L 3

In absence of a test for comparison of medians, we cannot accept some of the statements here. The same problem exists for sections 4.1.2, 4.2.1 and 4.2.2.

Authors:

In line with what Referee 1 also suggested, we will statistically test the differences in sediment concentration between the samples sets and include these test results in the revised ms, simplifying the first part of this section and the ensuing similar section.

Nonetheless, we do believe that we can affirm that differences are marked, even if differences are not statistically significant. In this respect, we also want to stress that we are simply providing a description of the different sample sets, which, in turn, serves as possible justifications for the differences in the curve fittings for the different sample sets.

Referee:

Pg 457, L 1

Re-write: "Among-site".

Authors:

We believe that "between-site" is more appropriate in this case.

Referee:

Pg 462, L 2-24

I strongly suggest re-writing conclusions grouping all text in one paragraph, avoiding items lists.

Authors:

We have addressed this matter under the general comments.

Referee:

Table 1

Use capitals for first letters through the table.

Substitute "no. samples" with "N".

"OM" has not been used in the main text and is not defined in the caption.

Table 2

See coments for Table 1.

Table 3

See coments for Table 1.

Authors:

As suggested, we will use capitals for first letters, substitute "no. samples" by "N" and define "OM" in the title or legend of the revised tables 1, 2 and 3.

Referee:

Figure 2

Use capitals:

"Normalized ...".

"Sediment concentration ...".

Abbreviations in the caption do not correspond with the legend in the figures (eg, "PAM" versus "S_PAM").

Authors:

As suggested, we will use capitals and correct the abbreviations in the caption in the revised Figure 2

Referee:

Figure 4

Abbreviations in the caption do not correspond with the legend in the figures (eg, "CTRL" versus "S_CTRL").

I suggest using "(slope)" instead of "_slope" or "micro-plot" instead of "_micro" in the legend. Legend must be re-written.

Authors:

As suggested, we will use correct the abbreviations in the captions in the revised Figure 4.

Referee:

Figure 6

You have pretty space. Why not writing "eucalypts" instead of "euc."?

Explain why points and line for "catchment" are different.

However, I would delete points for catchment, as only function lines are represented for the rest of variables.

Is it possible to add some graphical measure of exactitude or confidence for lines?

Authors:

We have not substituted the abbreviation "euc." for the full word in the revised Figure 4 as a matter of consistency with the other figures but we have added an explanation of this abbreviation and we will clarify the differences between the points and the line for "catchment". However, we prefer to maintain the points as they give some idea of the scatter around the line. For the same reason, we have presented points as well as fitted curves in Figure 2 (micro-plots) and Figure 4 (slope-scale plots). We have not done so in Figures 3 and 5 for the sake of "readability". This readability is also the reason why we have not introduced a graphical measure of exactitude or, e.g., 95% confidence intervals in the different figures; at the same time, however, this exactitude is indicated in the last column of Tables 1, 2 and 3.

REVIEWER3

General comments

Authors:

thank you for your positive evaluation of our manuscript

Specific comments

Referee:

Part of the section 3.3 should be in the Results section as the authors are already advance some results

Authors:

We fully agree that part of section 3.3 concerns in fact results. Nonetheless, we do believe that the methodological aspect of this part justifies its inclusion under Materials and Methods. Furthermore, we think that moving these results to the R&D section would be rather awkward, as it would require either adding an initial section where these results are presented and discussed or adding to each of the existing sections these results for the respective data sets.

Referee:

Pag. 457. Line 13: year within brackets; are the units the right ones?

Authors:

Yes, we have double-checked with the reference that the units are the right ones

Referee:

I would like to ask the authors to simplify the text of the Results and discussion section.

Authors:

Also in line with what requested by referee 1, we will try to simplify the text of the R&D section of the revised ms and, in particular, the initial parts describing the sample sets.

Referee:

Could the authors highlight their discussion based on the results they have obtained and the associated literature instead of mention the coefficients and sediment concentration, that are already included in the tables anyway?

Authors:

Personally, we prefer to mention coefficients and concentrations in the running text, so that the reader is not obliged to check the tables. Nonetheless, we will try to highlight our discussion in the revised version of the ms.

Referee:

Could be possible to include in the Conclusion section which would be the next actions regarding the POF in a few lines? Are the authors planning new technical improvements or analysis of the data? Are you planning to try it under different scenarios?

Authors:

We will gladly add to the conclusion section what we plan to do next with our sensor. As the referee indicated, we have improved the design of the sensor (making it more robust and, thus, more suitable for field applications) and we are planning to test this improved version for continuous monitoring in the field as well as to improve data processing.

Referee:

Please, normalize sediment concentration units (g l^{-1} or g L^{-1}).

Authors:

We will correct this in the revised ms as well as tables and figures