OVERVIEW:

The paper aims to present in detail a soil moisture monitoring for the forests of the Middle Germany focusing on presenting the website based platform hosting the monitoring framework. The methodological framework is mostly well described and justified throughout the manuscript. The available data and the capabilities to display soil moisture status over a large forest territory is without a doubt valuable for stakeholders, forest managers and scientists. Moreover, the paper is generally well written (I especially liked the introduction). From reading the manuscript it is easy to see that the author team is very knowledgeable about their system and have taken the time to describe it and justify most of the choices within the framework architecture.

However, at its current state the manuscript appears to me not completely useful for non of the collectives you aim to address (i.e. international scientific community or stakeholders and forest managers at the national level). Below I outline why, some suggestions as well as specific comments on text and figures.

GENERAL COMMENTS

What would make the manuscript more interesting/engaging to the international scientific community?

- **(I)** **Improve readability**: there are multiple acronyms throughout the text (and also in the figures) which are not always easy to remember (reader needs to search through the document). Some of the explanations are very specific for forest managers or forest researcher (e.g. see my comment on track corners). I think the soil moisture monitoring system you have developed is valuable and very interesting.
- **(II)** **Scientific discussion and placing your SM monitoring within the context of available literature and ongoing SM monitoring efforts elsewhere**: I miss more discussion of how the system you present is "an operational high-resolution soil moisture monitoring framework for the forests in Middle Germany, which addresses the main limitations and problems of the existing monitoring systems". What are the existing monitoring systems and what are their shortcomings? Could you include a discussion on that? Also, are you referring to existing monitoring systems in Germany or around the world? What would be a comparably good SM monitoring system in another country? An example of an SM monitoring systems, based on SM observations from cosmic ray neutron sensing would be COSMOS UK (see https://cosmos.ceh.ac.uk/data). They feature a similar system to the traffic light system you describe, you could perhaps compare it to such a system and/or include examples from forested sites.

Discussion on soil moisture observations and their usefulness in such a SM monitoring framework: There is no mention or discussion on how to incorporate actual soil moisture observations in your framework and how it would benefit from it. Are there any hydrological observatories where you could apply your modelling framework but then improve it? You make a shy suggestion in the Outlook section, but that is rather short and underdeveloped.

Perhaps too much German on figures and in text: in Section 4.4. as a non-proficient German speaker I found it difficult and unmotivating to follow. I would find it much more interesting, if the platform could be presented in the publication already with translation in English (i.e. wait until then to publish this

contribution or state a date, ideally in the near future, when the website will be available in English). Alternatively you can take the focus away from the online platform and mention it briefly and also produce a short video tutorial in English for users interested in the data and science behind it. Then focus much more on discussing the science (see general comment ii).

What would make the manuscript more interesting/engaging to stakeholders, environmental authorities and forest managers at the national level?

(i)   If the platform is intended to engage more stakeholders and forest managers in Germany, I believe it would be much more beneficial to publish in a German scientific journal which is also easily available for environmental authorities and forest managers. This is also where German speaking scientists interested in the platform (again because it is only in German at the moment) can explore it. At the moment the only way to go through the different options is via translating the page. When you do that the images stall and the page takes longer to load. For the expert mode you need to know at least some German or be patient to translate to start using the data files downloaded.

(ii)   To address such a public, perhaps also the text would need to be rewritten and more emphasis on how to use the platform and perhaps a couple of examples of the benefits of using it (i.e. practical examples) should be included.

To summarise, I think the SM monitoring framework presented here is very interesting and valuable as well as it has constituted a great effort to produce and should be shared within the international scientific community. However, I think that currently the paper is not suitable for HESS and should find its place in a different journal. For that I suggest either major revisions with a possible change of scope or a submission to a different journal.

Besides, see my specific comments, line by line, below:

Figure 1: Add a small inlet of Germany in one of the corners. Complement the Figure 1 caption with the meaning of the 3206 BWI abbreviation to aid readers. Briefly explain what the black dots mean (I understand is the inventory but please make it explicit).

Line 128: Have a very brief explanation of what REST API access is (few words)

Line 139: Section 3.1. is well documented/ choices well explained. However, I suggest a more intuitive sub-header starting with the model type and then introducing the name. spell out that it is a soil hydrological model and it is 1D. Line 140: I would start the paragraph with saying what the model is about and then go into these details for the benefit of readers who are not familiar.

Figure 2: explain in the legend or caption what KL or RR stand for. Make the dot for the BWI sites slightly larger on the legend. Why is this figure relevant to show here and why not in Annexes?

Figure 3: same comment on the BWI dot

Figure 4: remove "violin plots with" from figure caption, it is redundant. Otherwise figure is quite informative

Figure 5: useful figure giving a good overview. Small detail on caption, change to "for a selected"

Figure 6: green balloon "Daily meteostation data from 2010" sounds like the data is from that year. I understand it is from 2010 onwards and up to current?

Section 4.1. Line 272 what does "first hundreds of meters" mean in this sentence? please rephrase or clarify. Also you could discuss the differences between the point and raster set up already in Methods (I did not see it there). This section is not so easy to read, I expect more documenting (i.e. references and comparison between raster and point set ups).

Line 274 typo "in" instead of "is"

Figure 7: On your (b) plot in the legend the light yellow and green are very difficult to see. You have the same issue on the lightest colours in Figure 8 on the legend.

Fig 9: very nice and informative on the evolution of SM along a whole year

Line 357: for the readers who may not know what track corners are, can you please include a reference?

Figure 10: another interesting and useful figure from scientific point of view.

Figure 11 and 12: entirely in German, basically snapshots and (at least when I download the pdf), the resolution is quite low. I struggle to see the text (Fig 11 for example) and think it occupies unnecessary space. Instead of these figures an explanatory video could be much more useful.