

Interactive comment on “Seasonal variation in vegetation water content estimated from proximal sensing and MODIS time series in a Mediterranean Fluxnet site” by G. Mendiguren et al.

Anonymous Referee #3

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This paper studies the seasonal variation in different metrics of vegetation water content measured on the field, calibrates empirical equations to retrieve those metrics using field measurements and reflectance data derived from ASD and MODIS and finally compares the performance of the empirical equations to estimate Fuel moisture content (FMC) and Canopy Water Content (CWC) to those estimates derived from Radiative Transfer Models (RTM) following methods published by Trombetti, Jurdao and colleagues.

The material of the papers is of potential interest for many readers and researchers and the authors support their study with terrific field measurements. However, the paper is not a self-contained narrative, lacks on detail in many sections and therefore it does

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not stand out! In summary, I consider the paper has a lot of potential to be published but not in its current format. I encourage the authors to have a better thought around the questions indicate above, re-structure the paper and re-submit.

Some general comments for each of the different sections can be found below.

1. The abstract does not give a concise summary of the paper. It only cover methods and results but the authors should clearly state why they are doing these analysis and presenting these results as well as the implications of her conclusions and findings.

2. The introduction does not clearly states the original contribution of this work. Does this paper builds on previous key work? Which are the knowledge gaps it is trying to fill in?

3. The methods section lack on detail/justification in some aspects:

a. Why do the authors compute FMC/EWT from a subsample and the quadrat? What do the authors want to prove with this? Is this important? Again, the research question is not clear. This distinction between quadrat and subsample add complexity to the paper so it should be clearly justified.

b. The authors should explain more in detail the methodologies from Trombetti and Jurdao they are applying and presenting in this paper. For example, Jurdao et al 2013 derived FMC in woodlands in the Mediterranean and Eurosiberian region using two different Look up Tables (LUT). The authors do not specify which LUT they are using (I assume they are using the LUT developed for the Mediterranean region?). Also, the authors must justify the selection of those methods. Why did you select Jurdao's method that was developed for closed woodlands and nor other more suitable for dehesa type ecosystem? This is definitely something that should be discussed in the discussion section. The apparent worst performance of the RTM models in comparison to the empirical equations may be related to this.

c. The authors should explicitly present in the results section the equations they derive

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for the empirical models.

4. Results do not appear to be well discussed in relation to previous published works (e.g. how the author's findings may contribute to clarified/complement previous findings) and are difficult to follow because the research questions is not clearly identified in the introduction and the implications of their findings are barely discussed. The results presented around FMC/CWC derived using the quadrat/subsample samples are difficult to follow and not well justified. Are the authors trying to conclude which is the better methodology in order to propose a standard sampling protocol? The authors Should also improve the description of the results and avoid qualitative or vague terms (see specific comments)

5. Figures do not have clear captions. The authors should carefully work on figures caption so they are self-contained. Figures 2, 4 and 5 are difficult to read. I would suggest the authors to increase the size of figure 2 and simplify figures 4 and 5. Is it important to include here the results from the quadrat and the subsample? The authors should only consider only the most relevant information.

Specific comments: The line and page numbers refer to those provided in the printer-friendly version that I downloaded from the website.

Page. 5505 Line 6. Include "a" before "Mediterranean"

Page. 5505 Line 12. "Due to the high seasonal Dm variability. . ." This sentence seems to be out of context.

Page. 5505 Line 14 onwards. GEMI, GVMI, etc. need to be defined.

Page 5508. Line 4. "Secondly, the model performance...". Which models do the authors refer to? They have not presented any model yet.

Page 5509 Line 20." Each EWTsample and a sub-sample from each quadrat . . ." This is confusing. My understanding is that EWT sample refers to the EWT derived from the sub-sample? Why do the authors then write here EWTsample and a sub-sample from

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each quadrat, isn't that the same?

Page 5510, Line 14. " where LAI is the leaf...and EWT is obtained from eq (2). Again I am confused. Do the authors refer to EWTsample.

Page 5511. Lines 24-26 and Page 5512 Lines 1-8. The description of the indices and the comparison with the RTM models do not belong to the "Field sampling " section. These should be moved to data analysis. The same applies to Page 5512 Lines 26-28 in MODIS data section.

Page 5513. Lines 23-25. "As recommended in Steyerberg..." should be moved to line 20 before defining the RMSE.

Page 5515. Line 1. "...comparison between the spectral indices...". Spectra indices should be replaced by empirical approach (along the manuscript) since Jurdao and Trombetti also used spectral indices in their RTM modelling.

Page 5515. Lines 27. "EVI performed better". Do the authors mean that EVI was the index with the highest correlation coefficient with FMCe and FMCq when using the reflectance from MODIS?

Page 5516. Lines 11-12. "RTM was closer to the empirical models" Do the authors mean that RTM performed similarly to the empirical models?

Page 5516. Line 16. Figure 6 should be Figure 8.

Page 5517. Lines 17. "...LAI which is even higher correlated than those...". Higher correlated to what?

Line 5518. Lines 22-23. "RTM only overcomes empirical approaches when structural information constrains the model inversion". I agree however I do not think this statement justifies the worst performance of RTM in comparison to the empirical models in your study since the method the authors used (Jurdao et al 2013) includes such structural information. I suspect that Jurdao/Trombetti methods did not work well in this

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study because they were not designed to be apply in Mediterranean dehesas).

Table 1. I suggest the authors to improve the caption of the figure so the reader can quicker understand what does Bx mean. The authors should also explain what does NIRREC and SWIRRec stands for.

Figure 6. The authors should also explain what does RTM FMC (Grassland and oak) mean and why is it different from RTM (grassland).

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