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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 #1

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The paper by Mendiguren et al. includes the description of an experimental study carried out within the monitoring of carbon fluxes. It deals with the retrieval of water content for grasslands using different spectral indices from both MODIS images and proximal sensing radiometers. The study is well grounded in terms of RS and statistical methods, but it may be strengthen if biophysical relations were more clearly stated.

The discussion of results would benefit by extending statistical relations with more explicit references to biophysical processes, such as relations of water stress to LAI-chlorophyll reduction, which is particularly evident in the case of grasslands. The conclusions drawn by the authors are very much related to grasslands physiology, but it would not hold for other vegetation types, such as trees or shrubs. For this reason,

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indices that are not directly linked to water content (such as NDVI or EVI) provide high explicative power. The authors should state this clearly in both the abstract and the conclusions. For this reason, I strongly recommend to use grasslands instead of vegetation throughout the paper, including the title and the abstract, as they cannot extend their conclusions to other vegetation types other that what they actually sampled. Another issue is to better explain why certain indices provide higher explanation than others, and first test whether those R2 or RMS values are statistically significant or not. To explain these differences, proximal sensing measures only grasslands at nadir view angle, but MODIS includes also trees, their shades, and other artifacts at up to 20° view angle.

1. Introduction. Include formulas of all referred terms. 2. For this introductory section, you may gain by reading the Yebra et al.'s (2013) review. 3. Page 5505:5: "These indices monitor the vegetation water content by indirectly relating it to another biophysical parameter that is used as a proxy of water stress. This is the case of the Normalized Difference Vegetation Index (NDVI) (Tucker, 1979)". I think this is a misleading sentence, as NDVI has very little relation to plant water content, and therefore it should never be used as a proxy of water stress. It can eventually estimate indirect effects of changes in water content, particularly when reaching stress conditions, such as reductions in chlorophyll or LAI, which is a different issue. 4. Avoid using qualitative terms in the description of results. Correlations are not better or worse, but higher or lower. 5. You compare empirical models with RTM models. It is not clear whether the RTM models used were the originals developed by Jurdao et al. (which did not intend to estimate CWC but only FMC), or do you parameterize them somehow. In this case, please include technical details. Otherwise, state why. 5. page 5517/5: "Therefore, the strategy to capture better the variability of vegetation water content in this ecosystem should be to sample more times but fewer plots". Check grammar. 6. page 5517/17: "CWC depends on LAI which is even higher correlated than those two variables". Several studies have shown that LAI contribution to total reflectance variability is much higher than water. You may refer to (Bowyer and Danson 2004). For this reason also,

CWC should provide more accurate retrievals than FMC, as it depends on LAI, which is highly correlated to the spectral indices 7. Conclusions. “Results indicated that FMC and EWT showed lower spatial variation than CWC”. This is pretty obvious, as CWC includes another factor which also varies throughout time.

Figure 4 is too complex. Think about alternative ways or restrict the information you consider relevant for displaying. From comparison with Figure 5 is very difficult to extract any conclusion. Why figure 8 is not in color?

References: Bowyer, P., & Danson, F.M. (2004). Sensitivity of spectral reflectance to variation in live fuel moisture content at leaf and canopy level. Remote Sensing of Environment, 92, 297-308. Yebra, M., Dennison, P., Chuvieco, E., Riaño, D., Zylstra, P., Hunt, E.R., Danson, F.M., Qi, Y., & Jurdao, S. (2013). A global review of remote sensing of live fuel moisture content for fire danger assessment: moving towards operational products Remote Sensing of Environment, 136, 455-468.

Interactive comment on Biogeosciences Discuss., 12, 5503, 2015.