

Interactive comment on “Crop water stress maps for entire growing seasons from visible and thermal UAV imagery” by Helene Hoffmann et al.

Anonymous Referee #1

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General Comments: This manuscript presents an interesting case-study of the use of UAV imagery to map water stress over the course of a growing season (3 dates) in a barley field in Denmark. The authors used both RGB and thermal imagery to derive a Water Deficit Index (WDI) that relied on both land surface temperature and vegetation greenness measurements. The paper convincingly demonstrates that the addition of the vegetation greenness index to the water stress index (versus the more common approach that does not do this) is valuable for accurately mapping the spatial and temporal patterns of water stress. Overall, this paper is extremely well written, presents strong validation data, and would be a great contribution to the literature – both from a purely remote sensing perspective (UAV applications in general) and from a crop science/agricultural management perspective.

Specific Comments: I did not find many problems with this manuscript. I would like to

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point out a few minor issues, though. Firstly, in Figure 4 – could the authors please explain the data gaps a bit further – why are there no gaps with the RGB imagery, but there are gaps with the thermal imagery? Secondly, It is challenging in the images presented in Figures 4-6 to clearly understand the patterns of crop ripening versus bare soil. I think it would be helpful to include some labels or annotation, as was done for some of the figures to clearly show examples of these types of locations – for example, to accompany the text descriptions on page 14?

Technical Corrections: 1) Title: Would be more accurate to state for “an” entire growing season (not seasons) since it is a single-year study. 2) Materials and Methods, 2.1 Site: Lines: 12-13 – missing word or improper word use: “while” - “The upper 0.25 m of the soil profile was homogeneous sandy loam while coarse sand with a relatively poor capacity to retain water below.” 3) 2.3: Can the authors provide a citation or evidence for the following assumption? “We assumed that ripening barley had a similar green-red DN response to that of bare soil. . .” 4) Figure 4c – is there a better contrast stretch that can be applied to this image to display the true color? It seems highly washed out and difficult to interpret the crop pattern.

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