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Interactive comment on "Technical note: A simple approach for efficient collection of field reference data for calibrating remote sensing mapping of northern wetlands" *by* Magnus Gålfalk et al.

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1. Comparison to other (similar) methods. It is true that less time in the field is traded in for more time behind a computer classifying images semi-automatically (compared to the traditional methods). We agree that this is a nice tradeoff, and in addition that the method is very robust for different weather conditions (high wind, rain) which would not be the case for a e.g. a drone (see answer to RC #1–4). Traditional methods are described on page 2 (visual estimation, point frame assessment and digital photography), and are generally slow on large areas such as 10 x 10 m (or even 20 x 20 m which is possible using a camera height of 6 meters which is now suggested in the manuscript)

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as they require individual attention to multiple smaller sub-areas e.g. 1 x 1 m representing grid cells of the larger area. If extent of individual land cover classes are measured accurately in each such grid cell the traditional methods are very slow. Therefore, land cover fractions in each grid is often arbitrarily estimated visually to speed up assessments, likely resulting in lower accuracy and greater subjectivity among persons, than photographic methods such as proposed here. Digital photography is faster, but often downward facing cameras from small heights have been used. Our method captures 10 x 10 m in one image (seconds in the field) and then a few close-up images for reference of typical land cover under current light and weather conditions. - We have now added information about the time used for different steps in our workflow in section 4: “In a test study, we were able to make classifications of about 200 field plots in northern Sweden in a three-day test campaign despite rainy and windy conditions. For each field plot, surface area (m2) and coverage (%) were calculated for each class. The geometrical correction models (lens distortion and ground projection) was made in about an hour, while the classifications for all plots took a few days.”

2. Accuracy assessment. See answers to RC #1–1 and RC #2–1.

3. Geometric correction. See answer to RC #1–3.

4. Use of terms. We have now changed the term “ground truth” to “reference data” throughout the text.

5. Limitations for high vegetation. High vegetation is for example high grass type vegetation that is also dense enough to obscure the ground behind it. Increasing the camera height will decrease this potential problem, and it will be worse for large distances (near the edge of the field of view) as the viewing angles increases from nadir. For short grass, rocks etc. we did not have any problems from this, neither did we have problems from Birch trees as they do not grow on the mires and the shrub/brushwood was only a couple of decimeters high. For plots with high vegetation we used a larger camera height for this reason. Another solution for such plots could be to direct the

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camera towards nadir, making angles smaller and the obscuration less – this is mentioned in the supplementary information S1 (manual), step 2, “Alternative 2 is to stand in the center of the plot and. . . as tall vegetation will not obscure the view towards lower vegetation as much”. - We have now added a paragraph on vegetation height, our experiences, and solutions, at the end of section 3: “There is however a small difference, as the geometry (due to line of sight) does not provide information about the ground behind high vegetation in the same way as an image taken from overhead. In cases with high vegetation (which is some of our 200 field plots), mostly high grass, we used a higher camera altitude to decrease obscured areas. Another possibility is to direct the camera towards nadir (see the manual in Supplementary material S1) to image areas -5 to +5 meters from the center of a plot, further decreasing the viewing angles from nadir. We did not have any problems with shrub or brushwood as it was only a couple of decimeters high, and Birch trees did not grow on the mires. We also recommend using a camera height of about 6 meters to decrease obscuration and to increase the mapped area.”

6. Writing. The acknowledgement heading has now been moved closer to the acknowledgement text. The start of sentences have also been improved throughout the paper.

We would like to thank both anonymous reviewers for their valuable comments for improving the manuscript.

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