Interactive comment on "Laboratory, field, mast-borne and airborne spectral reflectance measurements of boreal landscape during spring" by Henna-Reetta Hannula et al.

Anonymous Referee #1

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The paper describes the data collection of spectral reflectances conducted mainly in the Sodankylä region over multiple platforms. The measurements aim to be representative of different snow and weather conditions (e.g. wet or dry snow for the former, clear or covered for the latter) and were organised such that measurements from different platforms were overlapping.

The manuscript is well written and easy to read from start to finish. The laboratory measurements, field campaigns and instrumentation as well as potential sources of errors and uncertainties are thoroughly described. The multi-platform measurements seem to have been very well coordinated and organised. As a consequence I would

change very little of what is currently in the manuscript and only have minor comments/clarifications.

My two main comments therefore do not concern what is in the manuscript, but what is missing from it. Firstly, one of the most interesting aspect of this study is the availability of data looking at the spectral reflectance of the same surfaces but with different instruments. The manuscript incomplete and will remain so unless a section (1) compares the reflectances obtained on different platforms on overlapping dates over the same surfaces (2) discusses the implications of the differences, bearing in mind future users (3) plots from multiple platforms showing spectral reflectances on overlapping days over the same surfaces are added.

Secondly, the data in zenodo are well organised, but their (justified) discretization into platform and scale means there is a large number of files for potential future users to wade through. It would be useful, for each platform and scale, to include representative plots of each dataset in zenodo to have a quick visualisation of the sort of data available. It is one thing to make data available, it is another to make them user-friendly and, as such, re-usable. The manuscript describes invaluable datasets that should be published and used, and I trust that adding such quick visualisation of the data through these plots will help make these datasets more user-friendly.

I trust that the manuscript will be fit to publish when the above suggestions and minor comments below are addressed.

Minor comments: Line 134 - Sodankylä is most probably taiga snow. The Sturm snow cover classification system has been accepted as the standard in our field for a long time, but it is perhaps time we acknowledge its limitations: the European Alps are, after all, classified exclusively as maritime. While it is not the task of this manuscript, I am confident the authors are very familiar with the type of snow in Sodankylä and could therefore rely on their own expertise, rather than on a classification relying exclusively on measurements from Alaska, to describe it.

L149 - Could there be a quick explanation of what Spectralon is?

L395 - Minor difference, but I think changing the start of the sentence to "As an example, Figure 11 shows reflectance values on 5 May 2011 observed over et." would make it sound less like Fig 11 is a random example not even used in the campaign. Adding the exact date to Figure 11, rather than just "May 2011", would also help clarify.

Table 2: This is a big table and it is easy to lose some information. If possible, a Gantt chart or something similar showing the multiple platforms and overlapping dates would make it easier to see which measurements from which platforms are overlapping.

Figure 9: Is the label on the y axis correct? These are not MODIS band 4 reflectance measurements, but mast-spectroradiometer measurements to match MODIS band 4. This should be clearer. Conclusion: Data from Sodankylä are also being used for driving and evaluating snow models (Essery et al., 2016, gi-5-219-2016) and Earth System Models, notably as part of ESM-SnowMIP (Menard et al., 2019, essd-11-865-2019). It may be worth mentioning that adding albedo measurements to these datasets would be invaluable to the snow modelling community.