Response to Editor and Anonymous Referee #1

Editor and referee comments are in blue, authors' responses are in red.

Dear Dr. Bair - The second round of reviews are completed on your manuscript, and I agree with the assessment of both Reviewers that the manuscript is now acceptable for publication in The Cryosphere. In preparing the final version, please pay particular attention to the comments of Reviewer #1 regarding the comparison shown in Fig. 1c, and adding a brief discussion on observations of the blue hook also over glacier ice.
Thanks very much for your contribution to The Cryosphere.
Chris Derksen

We thank the Editor and Referee for the second round of reviews. We have responded to Referee #1's comments below and do not find they require revision of the manuscript.

Dear Editor,
sorry again for my late re-review. I see that the authors decided to keep this manuscript separated from Bohn et al. (now in press), and they addressed to different objectives in the two manuscripts.
The authors now added further evidence regarding the occurrence of the "blue hook" in reflectance spectra of snow. They observe that the hooking can be due to multiple issues, whereas uncorrected topography is just one of the possible causes.

We find the sentence "They observe that the hooking can be due to multiple issues, whereas uncorrected topography is just one of the possible causes" to be confusing as three causes of hooking have always been presented, starting with the first manuscript.

Still the comparison showed in Fig. 1c is a bit strange to me. I would suggest the authors to provide further discussion on this particular comparison. The drop in reflectance for wl<700n is marked here. Given that the surface was flat, I assume that in this case the hooking was due to atmospheric correction or related to the refractive index of ice.

Per the Referee's first review request, we've explicitly stated that the spectra are from level and fully snow-covered areas: "The measured and modeled spectra in Figure1a-c and Figures 2a-c are from level and fully snow-covered areas , i.e., no vegetation within the pixel or in adjacent pixels and an optically thick snowpack." Thus, the Referee is correct that the causes must be atmospheric correction and/or the complex refractive index of ice. Both of these causes are already discussed.

I would also suggest to broaden their discussion also on glacier ice. In my review of Bohn et al. I detailed this issue.

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Since the Referee is anonymous, it's tough to find his or her review on Bohn et al. (in press). And even after re-reading all three Bohn et al. (in press) reviews, we cannot find the glacier ice detail the referee is referring to.

The hooking can be observed on glacier ice as well. I think this should be mentioned in this manuscript.

Perhaps, but without a citation, we are not sure where this evidence is. Further, we posit that finding clean and level exposed glacier ice over a pixel size of say 30 – 60 m is unusual.

I still think that the "brief communication" was not a good choice for this topic.

We disagree. It's a concise topic that is fitting for a Brief Communication. And if the Referee "still thinks" it was not a good choice, then why wasn't that point made in the first review?

In fact, a standard article would have allowed the authors to provide a detailed description, evidence and possible correction for these errors in the spectral reflectance of snow. They have already access to several data from PRISMA, EnMAP, DESIS (+ AVIRIS, APEX etc.) in snow-covered regions to test their approach.

Again, we disagree.

In conclusion, I think that this manuscript can be accepted upon minor revisions. Given the amount of imaging spectroscopy missions that will be launched in the next future, this issues will be addressed more deeply by the remote sensing community interested in the cryosphere.