General comments

The paper is potentially interesting, but I find the content a bit weak. On the face of it, the paper is a straightforward evaluation of satellite data using ground-based (in situ) data. This is a reasonable thing to do, standard and worthwhile. However, I find the authors do not convey with sufficient force why their research is of interest. In particular, it does not come through clearly enough that, as I see it, this is a paper on the evaluation of satellite data. One reason for this is that I find the paper a bit disorganized, with the text not clear or not flowing in a number of places (see specific comments for examples).

I also would like the paper to have more details on the representativeness of the ground-based station at Caribou, and the motivation behind choosing just 8 days (and why these 8 days) for the study of the diurnal cycle. Finally, the figures need more details, in particular in the caption (see specific comments).

Once these issues have been addressed, as well as the specific comments below, the paper should be suitable for publication in HESS.

Specific comments

P. 7666

L. 20-21: Why do you get this improved correlation?

L. 23: Do you need "To a lesser extent"?

P. 7667

L. 3: Introduce acronyms when first used in the main manuscript.

L. 16: Provide examples of the regions where in situ networks are sparse.

P. 7668

L. 1-2: Meteorological station networks also aid satellite data, e.g., evaluation, improved understanding.

L. 3: Remind the reader of the "commonly known" needs for monitoring snow and ice temperatures.

L. 4: Lack of ground measurements at high latitudes?

L. 9: Which way?

L. 15-17: This statement is vague. Please rephrase.

L. 18-21: Provide a better link in the text discussing why you study the MODIS LST data.

L. 19: Identify the seasons studied.

L. 21: Mention what you will do in each section of the paper.

P. 7669

L. 8: Why Caribou? Refer to CREST-SAFE (discussed in Sect. 3).

L. 17: Indicate what is CREST-SAFE.

P. 7670

L. 14: Not clear to me the point about average daily cloudiness. Please rephrase.

L. 24: Mention the winters considered (2013, 2014).

L. 25: Why this "cannot be ruled out"?

P. 7671

L. 5: What criterion is used to cluster the specific temperature ranges? Is there a bin over which this is done?

L. 6: Do you mean there is no radiative cooling?

L. 9: Is the inverse relationship exact or approximate?

L. 11: Identify the temperature difference.

L. 16: How does wind speed affect the temperature difference?

L. 28: Identify which table (if any) shows this correlation. For the sentence "LST…", I suggest you do not start a sentence (here and elsewhere) with an acronym.

P. 7672

L. 13-24: This is a bit rambling. It is not clear to me what argument the authors are making.

P. 7673

L. 1: How are days selected?

L. 2: How were wind speed and cloud coverage taken into account to explain these disparities?

L. 6: Feet per second is an unusual unit. I suggest you use metres per second. Did the temperatures peak all the time or most of the time, i.e., generally?

L. 9: Previously established where?

L. 13-15: Explain further this understanding. How do you reach it?

L. 15: Is the day shown in Fig. 6b representative?

L. 22-24: This should be mentioned earlier.

P. 7674

L. 1-3: Explain further why the same cannot be said for the cold winters of January and February.

L. 4: Are eight days enough for the diurnal cycle study?

L. 13: Do you mean these change slowly over time?

L. 18-20: You mention here validation, which seems to me what you are doing in the paper. Please make sure this is flagged clearly earlier in the paper.

P. 7675

L. 6: What do you mean by not being clustered?

L. 7: How does wind speed play a role?

L. 17: Is Caribou representative?

L. 22-23: Is the point that you want to discuss the use of MODIS LST for avalanche warnings? If so, please make clearer.

P. 7676

L. 6: From where does this supplementary information come from?

L. 8-11: What would you expect to find from this study?

P. 7682

Fig. 2 caption: Indicate if the observing platform is Caribou. Provide details of the information in the legend. Identify units and information in both y-axes.

P. 7683

Fig. 3 caption: Mention the units (I suggest you use degrees Kelvin instead of degrees Celsius) and the linear fit plotted.

P. 7684

Fig. 4 caption: Indicate if the observing platform is Caribou. Mention the linear fit plotted and the units of what is plotted. Do the same for Fig. 5.

P. 7686

Fig. 6 caption: I suggest you use Kelvin instead of Celsius. Mention the units, and describe the legend in the caption (do the same for Fig. 7).