Comments on: Correction of CCI cloud data over the Swiss Alps using ground-based radiation measurements

In this manuscript the authors present a method to correct cloud detection results over high altitude regions which are particularly challenging due to snow cover.

Overall, I believe the manuscript is generally well written and I really only have some minor comments and corrections. I therefore, recommend that it be considered for publication after minor revisions.

- **Page 2, Line 8:** These papers are still under review so 2017 needs to be changed to 2018.

- **Page 2, Line 17:** The author mentions shortwave and longwave measurements before mentioning passive. Also, microwave should be grouped with shortwave and longwave measurements. Finally, the next sentence uses "latter ones" which refers to a group that contains active instruments and passive microwave when I believe the author intends for this second sentence to refer only to active instruments.

  For example, this would be clearer "...passive measurements of shortwave, longwave and microwave, as well as active instruments such as cloud radars and lidars. The latter ones ..."

- **Page 3, Line 7:** 'open-source' refers to source code. Another terminology should be used.

- **Page 3, Line 8:** 'the National' → 'the US National'

- **Page 3, Line 9:** 'from MODIS' → 'from the MODIS'

- **Page 3, Line 9:** 'the National' → 'the US National'

- **Page 3, Line 12:** '3.7 µm. For' → '3.7 µm-channel. For'

- **Page 3, Line 18:** 'degrees' → 'degree'

- **Page 3, Line 18:** A more complete list: "data such as atmospheric pressure, temperature and ozone, snow and ice cover, and land and sea surface temperature, all coming from ECMWF ERA Interim (...) along with surface reflectance from the MODIS MCD43C1 product [Schaaf et al., 2011]."

- **Page 3, Line 18:** Choosing the phase based on cost is not how it is done for Cloud_cci. For all versions up to and including the version discussed in Stengel et al. [2017] a method based on that of Pavolonis and Heidinger [2004] and Pavolonis et al. [2005] was used. Newer versions use a neural network approach, much like the cloud mask.

  This brings up a very good question as cloud phase determination suffers from very similar problems as cloud detection. Have the authors thought about this in the context of high altitude regions?

- **Page 6, Line 15:** 'satellites' → "satellite's"

- **Page 9, Line 3:** 'pyrgeometers, respectively pyranometers,' → 'pyrgeometers and pyranometers, respectively,'

- **Page 9, Line 6:** I don't think the cosine of the incidence angle weighting is required for the thermal instrument.

- **Page 9, Line 13:** 'modified' → 'a modified'

- **Page 9, Line 13:** 'which have an' → 'which has an'

- **Page 9, Line 17:** 'come from' → 'comes from'

- **Page 9, Line 17:** Subscript 'sky' should not be italicized. Only subscripts that are variables should be italicized.

- **Page 9, Line 28:** Need a comma after the equation. And, 'sky' should not be italicized.

- **Page 9, Line 29:** 'approximated to 1' → 'approximated to unity'

- **Page 12, Line 11:** Need a comma after the equation. And, subscripts 'e' and 'm' should not italicized.

- **Page 12, Line 12:** Subscripts 'e' and 'm' should not italicized.

- **Page 12, Line 16:** Need a comma after the equation.

- **Page 14, Line 1:** Is their a formal way to train this decision tree that the author can describe and/or give references for?

- **Figure 10 caption:** 'letters corresponds to' → 'letters correspond to'

- **Page 17, Line 5:** 'twice larger' → 'twice as large'

- **Table A1 caption:** 'temporally with MODIS' → 'temporally with the MODIS'

References

Michael J. Pavolonis and Andrew K. Heidinger. Daytime cloud overlap detection from AVHRR and VIIRS. *Journal of Applied Meteorology*, 43(5):762–778, May 2004. doi:10.1175/2099.1.

Michael J. Pavolonis, Andrew K. Heidinger, and Taneil Uttal. Daytime global cloud typing from AVHRR and VIIRS: Algorithm description, validation, and comparisons. *Journal of Applied Meteorology*, 44(6):804–826, June 2005. doi:10.1175/JAM2236.1.

Crystal Barker Schaaf, Jichung Liu, Feng Gao, and Alan H. Strahle. *Aqua and Terra MODIS Albedo and Reflectance Anisotropy Products, In Land Remote Sensing and Global Environmental Change: NASA's Earch Observing System and the Science of ASTER and MODIS, Remote Sensing and Digital Image Processing Series*, volume 11, chapter 24, pages 549–561. Springer New York, 2011. doi:10.1007/978-1-4419-6749-7_24.

Martin Stengel, Stefan Stapelberg, Oliver Sus, Cornelia Schlundt, Caroline Poulsen, Gareth Thomas, Matthew Christensen, Cintia Carbajal Henken, Rene Preusker, Jürgen Fischer, Abhay Devasthale, Ulrika Willén, Karl-Göran Karlsson, Gregory R. McGarragh, Simon Proud, Adam C. Povey, Don G. Grainger, Jan Fokke Meirink, Artem Feofilov, Ralf Bennartz, Jedrezj Bojanowski, and Rainer Hollmann. Cloud property datasets retrieved from AVHRR, MODIS, AATSR and MERIS in the framework of the Cloud_cci project. *Earth System Science Data*, 9:881–904, 2017.