**Comments by Anonymous Referee #2**

Long term meteorological data are crucial for climate variability studies. It is of the utmost importance that these data are carefully collected, QCed, and stored, as well as fully documented (metadata). In that perspective, this paper presents a perfect example of the above, and it is important to support and promote such datasets to be available for the community.

The authors are very grateful to the anonymous reviewer for his/her positive, careful and useful review of the manuscript. A point by point response to each comment is provided in blue below. Changes in the manuscript are enlightened in **bold**.

**Additional changes in the manuscript :**
The dataset of snow vertical profiles has been extended to March 2018 (April 2015 in the first version of the manuscript) and these profiles are now provided in caaml v6 format (caaml v5 in the first version).

I recommend to accept this paper, with minor corrections, which are listed here:

- page 1, line 6: Unit is missing after 0.21.

It's ratio of irradiance so no unit. This has been added in the text.

- p1, l7: .... that can mainly be .... for snow water equivalent

Thanks, the sentence has been changed to :
« The estimated root mean squared deviation, **which mainly represents** spatial variability, is $\pm$ 10 cm for snow depth, $\pm$ 25 kg m$^{-2}$ for snow water **equivalent** and $\pm$ 1 K for soil temperature ($\pm$ 0.4 K during the snow season). »

- p1, l9: Reduction of 39 cm in the mean snow depth, but what does it represent in %age of the mean total snow depth?

39 cm represents 40% of the mean total snow depth for the period 1960-1990. This information was added in the sentence as follow :
"The daily dataset can be used to quantify the effect of climate change at this site with a reduction of the mean snow depth (Dec. 1$^{\rm{st}}$ to April 30$^{\rm{th}}$) of 39 cm from 1960-1990 to 1990-2017 **(40 $\%$ of the mean snow depth for 1960-1990)** and an increase in temperature of + 0.90 K for the same periods."
This information has also been added page 22 line 6 :
"It demonstrates that the mean snow depth reduction between 1960-1990 and 1990-2017 is 39 cm (**40 $\%$ of the mean snow depth for 1960-1990**), while the air temperature has increased by 0.90 $^{\circ}$C over the same period and the total precipitation does not exhibit a significant trend."

- p1, l17: required to run and evaluate

The sentence has been changed accordingly.

- p2, l15: (i) to extend

Ok, this has been changed.

- p2, l16: (ii) to provide .... (iii) to provide
Ok, this has been changed.

- p2, l20: I do not understand this sentence, and could not find underlined text in the paper => remove (?)
The « track changes » with respect to the former description of the dataset (Morin et al., 2012) was requested so that the paper was referenced in the Living data process of ESSD. Since the two referees found it  unnecessary and misleading, the underlining has been removed in the revised manuscript.

- p8, l7: Explain why the in-situ data are missing during Summer between 2011 and 2015
Historically, Col de Porte was dedicated to snow studies. Consequently, most of the sensors were removed and calibrated during summer. This is the reason why summer data are missing from 1993 to 2015 (see fig. 4 in Morin et al., 2014). In 2015, we decided to maintain the measurements during the whole year.
The text has consequently been modified as follows :
"The partitioning of the dataset between \textit{in-situ} data and the output of the meteorological analysis and downscaling tool SAFRAN \citep{durand1999, **durand2009**} is the same as in Fig. 4 of \citet{morin2012b}. For years 2011 to 2015, \textit{in-situ} data are restricted to the period 20 October of one year to 10 June of the next year. **Summer \textit{in situ} data are thus missing (calibration of the sensors during summer) from 1993 to 2015**. Starting on 10 June 2015, all data are \textit{in-situ} year-round except for very short periods with observation issues."

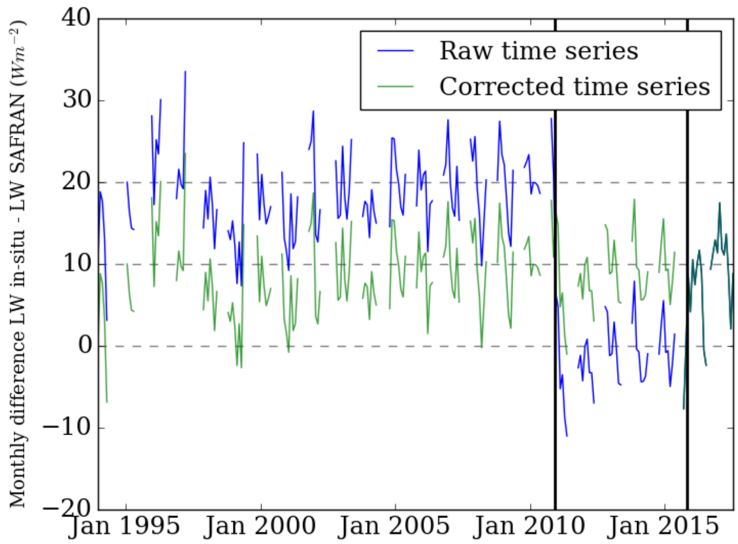
- p9, l5-10: The process of the correction is not "clear and clean" to me. Some information are missing: what is the Impact of a 10 W/m2 shift (or error) on the snowpack model? how does the final curve in Fig. 5 Looks like? is monthly average enough to assess the quality of the data (variation can be much higher on an hourly basis).

The impact of the longwave radiation correction on the simulations continuously increases along each winter season and becomes maximum during the melting period in spring. With the Crocus snowpack model, the yearly maximum difference in terms of snow depth ranges between 30 and 60 cm depending on the year, and between 150 and 300 kg/m$^2$ in terms of water equivalent of snow cover. In winter, a 2 K difference in surface temperature is common, with some much higher values. At the end of the season, the shift in the date of total melt out ranges between 5 and 10 days.

The curve in Fig. 5 corresponding to the final observation product is simply a plus or minus 10 W/m$^2$ shift during the two  periods when the correction was considered necessary, as now shown by the green curve. This allows removing the breaks although there is still a noise  between SAFRAN and observations. The bias identification was obtained from monthly comparisons between Col de Porte measurements and SAFRAN simulations for the Chartreuse massif at the same elevation. Only the significant temporal breaks in this difference can reasonably be attributed to instrumental issues. At shorter time steps (not shown here), and especially at an hourly time step, the differences between local observations and massif-scale simulations exhibit fluctuations, which are most likely due to local topographic effects, potential discrepancies between the local cloudiness and the simulated massif-scale cloudiness, etc. SAFRAN is the only other available reference because there was only one sensor. Therefore, it is unfortunately not possible to investigate with more temporal refinement the instrumental biases. Note also that the impact on snowpack simulations is mostly sensitive to systematic biases.

The text and figures were consequently modified as follows :

"Based on the hypothesis that the newest sensor **can be used as** a reference **because** it was fully calibrated at the **Physikalisch-Meteorologisches Observatorium (Davos, Switzerland)** outside and inside with a blackbody, the dataset was corrected as follow : -10 W m$^{-2}$ from 1993 to November 2010 and +10 W m$^{-2}$ from November 2010 to November 2015. **Since SAFRAN is the only available reference and does not account for local conditions, e.g. cloudiness, due to its coarse spatial resolution, it is unfortunately not possible currently to investigate with more temporal refinement this instrumental bias.** This correction, although **panning** the uncertainty values provided by the manufacturer, is of large significance for snowpack modelling considering the high sensitivity of the snowpack to **processes governed by** this variable (e.g. \citealp{raleigh2014, sauter2015, queno2017}). **Using the Crocus snowpack model with or without the corrections leads to a shift in the melt-out date ranging between 5 and 10 days (not shown).** "




- Table 2: CGR4 (and not CRG4)

Thanks, it has been modified.

- p10, l3: What are the relevant sources of data (list)?

This information has been added in the text :

"Precipitation data are manually partitioned between liquid and solid phase using all relevant sources of data at the site, **namely snow depth, surface albedo, surface and air temperatures and differences between heated and non-heated rain gauges (locs. 1 and 9)**."

p10, l6-7: If wind data used to correct for undercatch is different, then the correction factors must also be different, right?

Yes, we agree and the sentence was misleading. Locations 15 (used before 2013) and 18 (used after 2013) are very close. Thus in this case, we believe it is reasonable to assume no difference in the correction factors.

The text has been updated as follows:

"From 2013 to 2017, the wind measurement used for the correction **was the one** placed at location 18 (Fig. \ref{fig:scheme}) **instead of location 15, since the ultrasonic sensor at location 18**

**is more accurate than the wind sensor at location 15. Note that locations 15 and 18 are very close, i.e. a few meters, so that the wind speed values are not significantly different between the two locations.** "

- p14, l4: .... not corrected for undercatch, in contrary ....

Ok, it has been corrected.

- p14, l5: .... by the same sensor used for rain and snow datasets

Ok, it has been corrected.

- p14, l6: Explain why the undercatch (and not the undercatch correction?) is mitigated when using the PG2000

The undercatch is inversely proportional to the collecting area. Since the PG2000 collecting area (2000 cm²) is 10 times larger than the GEONOR collecting area (200 cm²) , the undercatch is thus less important for the PG2000. The comparison in case of snowfalls between the PG2000 (not corrected for undercatch) and the GEONOR (corrected for undercatch) showed a very good agreement.

The information was added in the text as follows:

"The total precipitation dataset is measured with the PG2000 sensor, **for which the undercatch plays a minor role compared to the GEONOR due to the 10 times larger collecting surface area ( Table 2)."**

- Table 5: For clarity, it should be moved in section 3.2 (where it is referenced)

Ok, Table 5 have been moved to section 3.2.

- p20, l13: Explain why the mean deviation is higher in summer (shading, surface properties?)

An explanation has been added in the paragraph as follows:

**«The temperature difference between the two sensors may be attributed to differences in soil properties, local topography and shading. The larger differences in summer may be due to (i) larger heterogeneity in soil wetness and (ii) the absence of the snow cover that spatially tempers the surface temperature signal in winter.»**

- I miss a short conclusion at the end of the paper. Few words summarizing the work and the dataset available.

A short conclusion has been added to the paper and reads:

"**\conclusions**

**This paper describes and provides access to the daily snow and meteorological dataset measured at the Col de Porte site, 1325 m a.s.l, Chartreuse, France for the period 1960-2017. The hourly dataset of snow and meteorological observations for the period 1993-2017 is made available along with weekly snow profiles from September 1993 to April 2015, soil properties and solar radiation masks. Based on measurements at several locations within the measurement field, we estimated the uncertainties and spatial variability of : the ratio between solar diffuse and total irradiance, snow depth, snow water equivalent and soil temperature. The data are placed on the repository of the Observatoire des Sciences de l\textquotesingle Univers de Grenoble (OSUG) datacenter :**

**\href{http://doi.osug.fr/public/CRYOBSCLIM_CDP/CRYOBSCLIM.CDP.2018.html}{http://dx.doi.org/10.17178/CRYOBSCLIM.CDP.2018}.** "