

## Response to reviewer 1

The editor's comments are in black and our answers are in red.  
Modifications of the manuscript are reported in bold and italic.

**Editor Decision: Publish subject to minor revisions (Editor review)** (27 Nov 2015) by Martin Schneebeli

Comments to the Author:

Dear Dr. Libois

Thank you for the revised manuscript. I found that your reply and changes sufficient for publication. Nevertheless, I have a few minor corrections, which I ask you to change in your manuscript (added below).

Best regards  
Martin Schneebeli  
Editor TC

Here a few points which need minor corrections:

line 9 "among others", do you mean "other factors" or "other papers"? In any case, a much more precise parameterization of the thermal conductivity is presented in (Löwe et al, 2013)".

We meant other factors, which was explicitly added. Reference to Calonne et al. (2011) was also replaced by the reference to Löwe et al. (2013):

Snow density controls the light e-folding depth (Libois et al., 2013) and the effective thermal conductivity of the snowpack (Sturm et al., 1997, ***Löwe et al., 2013***, among other ***factors***.

line 11: "The instrument": indicate type and manufacturer

This instrument was developed at LGGE. We specified this more explicitly in the text, and also added the brand of the multiplexer:

***"The albedometer, designed and assembled at Laboratoire de Glaciologie et Géophysique de l'Environnement, was deployed on 10 December 2012 [...]. The fibers are sequentially connected to an Ocean Optics Maya Pro spectrophotometer through a ***Leoni*** optical multiplexer.***

p. 14, l 6: "pointed" -> "pointed out"  
done

p. 14, l 10 "It does show a positive bias of about 2 K": air or snow surface temperature?

We mean air temperature, even though this is confusing because Fréville et al. (2014) is more dedicated to snow surface temperature.

In fact the warm bias of ERA-Interim 2~m air temperature is shown in Fig. 7 of Fréville et al. (2014), but Dome C is not part of the stations investigated. Hence, to avoid confusion we simply removed the reference to Fréville et al. (2014):

“As for **2 m** air temperature, it does not show any significant bias during the summer from 2000 to 2013 compared to Dome C II automatic weather station (<http://amrc.ssec.wis.edu/aws>). It does show a positive bias of about 2 K during the winter [...].”

p. 14, l 19 "priority on" -> "primarily to" or "with priority to"  
done

p. 16 l 20 "and somehow maintained..." -> this is not "somehow", alternating temperature gradient (Pinzer and Schneebeli, 2009) causes no coarsening and consequently an almost constant SSA  
“Somehow” was removed.

p. 19 l 18: definition of "winter period" is very loose, defined by a threshold temperature, net radiation. A clearer definition of the term is needed.

In this paper, winter and summer are defined with regards to snow metamorphism. Summer corresponds to the period when a coarsening of the grains is observed, the rest of the year being called winter. Hence we did not try to find a more precise definition in terms of temperature and radiation.

We modified the text as follows:

“During the winter period at Dome C, ***defined here as the period extending from late February to mid October when metamorphism is insignificant***, snowfalls deposit onto the surface fresh snow whose detailed characteristics generally depend on weather conditions.”

p. 20 l 21: change "XXIst century" to twenty-first century  
done

p. 24 l 6: "whole continent" -> the whole continent  
done

Acknowledgements: add: The editor thanks the anonymous reviewers for their work.  
done

Our own acknowledgements were also added.