Review of: « Climatic and insolation control on the high resolution total air content in the NGRIP ice core », by Eicher et al., version re-submitted to CP on June 7, 2016

General comments

As already shown in its initial version, the manuscript represent an important contribution to scientific progress in the domain of total air content in the polar ice cores, showing for the first time a correlation between local summer insolation and air content in a Greenland ice record, and the discovery of a NGRIP TAC response to DO-events with an interesting attempt for interpretation. By the way, I wonder if a response to DO should also be mention in the title.

A real progress has been made in the presentation and discussion of the data, making the paper easier to read and to understand. I propose the manuscript to be accepted for publication in CP.

I had below a few minor comments / questions and leave to the authors the decision if they wish or not to take them into account. In any case I would be interested to know their responses.

I thank the authors for this innovative contribution

A few minor comments

Line 27- 28: could be useful to add a reference to "Both processes intensify with increasing temperature"

Line 46: Freitag, pers. com. Could you precise the site(s) where this observation has been made.

Around line 50 and related to how surface snow structure might survive the recrystallization in the firn, please note that a pretty detailed discussion has been published in Lipenkov et al., 2011.

Line 195: "…we expect also no difference in pore volume Vc… True when Vc depends only on T and insolation. But it can also depend on other parameters, like wind,…

Section 4.3.1, relation to Ca2+/dust: should we conclude that dust concentration has a negligible influence on pore volume in the firn?

Lines 459 and below: As the authors mentioned, the artificial densification experiments (as referred as a personal communication of B. Stauffer) are not appropriate for simulating natural processes, mainly because these "sintering" experiments are made during a very short time compared to what happen in the nature. For that reason I suggest to delete this part, which I feel not to be necessary to the description of the

transient firnification model experiment. Instead, I would discuss more the assumptions made, as assuming a constant duration to read close-off.