First, we would like to thank Jan Lenaerts for his very useful, pertinent and constructive remarks which will improve a lot our paper. He will be thanked for this in the acknowledgments of our revised manuscript. Our responses are in blue in the text.

Review of "Important role of mid-tropospheric atmospheric circulation in the recent surface melt increase over the Greenland ice sheet" By Xavier Fettweis et al.
In this brief communication, the authors present the role of anomalous atmospheric dynamics in the recent warming on the Greenland ice sheet and surroundings. The paper includes sound methodologies and interesting conclusions, and fits well into the scope of The Cryosphere. However, I have two major and several minor issues, the latter mostly concerning English language, word order and logical structure. In summary, I recommend publication of this paper in TC after resolving both major issues and a profound revision of the English language and text structure. My comments, as listed below, hopefully assist the authors with that.
Main comments
1. In figure 2, the authors apply a 10 yr running mean on a time series of only 20 yr. First of all, I did not find evidence in the text why this running mean is applied. Moreover, the period of the mean is relatively long compared to the total length of the time series, so the relative weights of the first and last years are high relative to the years in between. In this case, won't this imply that the T700 trend is overestimated?

1. Indeed, our choice of applying a 10-yr running mean for smoothing the curves of Fig. 1 (and Fig. 2) is not justified in the manuscript. We have made this because it allows to remove the inter-annual variability and to highlight only the main changes in Fig.1 for having time series easier to read. To be coherent with Fig.1, we have applied the same smoothing in Fig.2 before computing the linear trend over 1992-2011. However, if we apply a 3-yr running mean, this does not change the results as you see below. Our reconstruction of T700 (Fig. 1e) still compares well with the reanalysis-based one and on Fig.2, the linear trend over the 20 last years is unchanged if we apply or not a X-yr running mean.

Below, there are the same figures as Figs. 1 and 2 but using a 3 yr running mean. Note that we have extended here the time series to include JJA 2012 for which the NAO anomalies are in continuity of the previous summers and for which a record melt has been observed. We suggest to include JJA 2012 in the revised version of our paper as well as to put the figures below in Supplementary Material for showing the independence of the running mean applied.

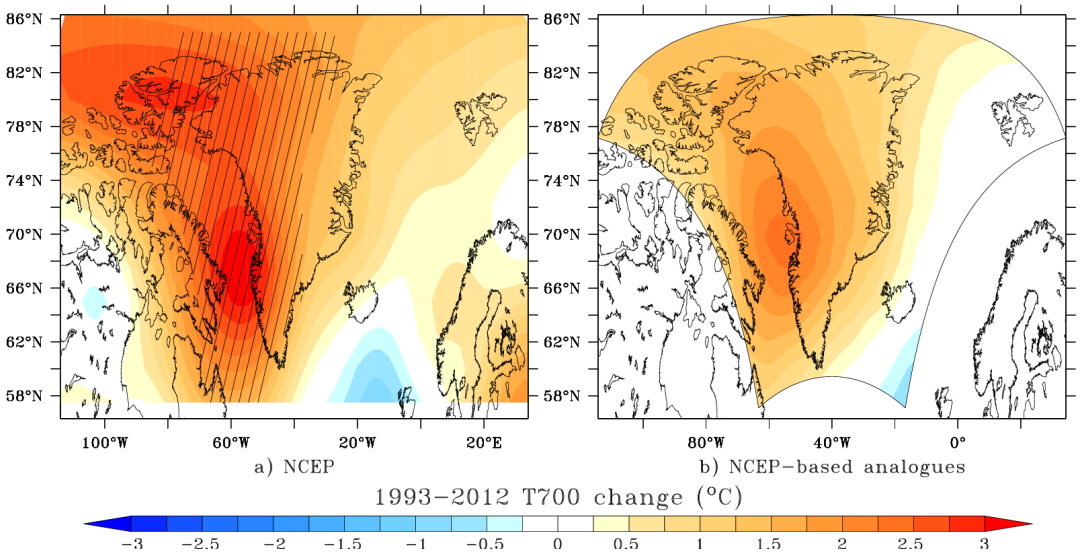

Fig. S 2: Same as Fig2 but using a 3-yr running mean and over 1993-2012 instead of 1992-2011.

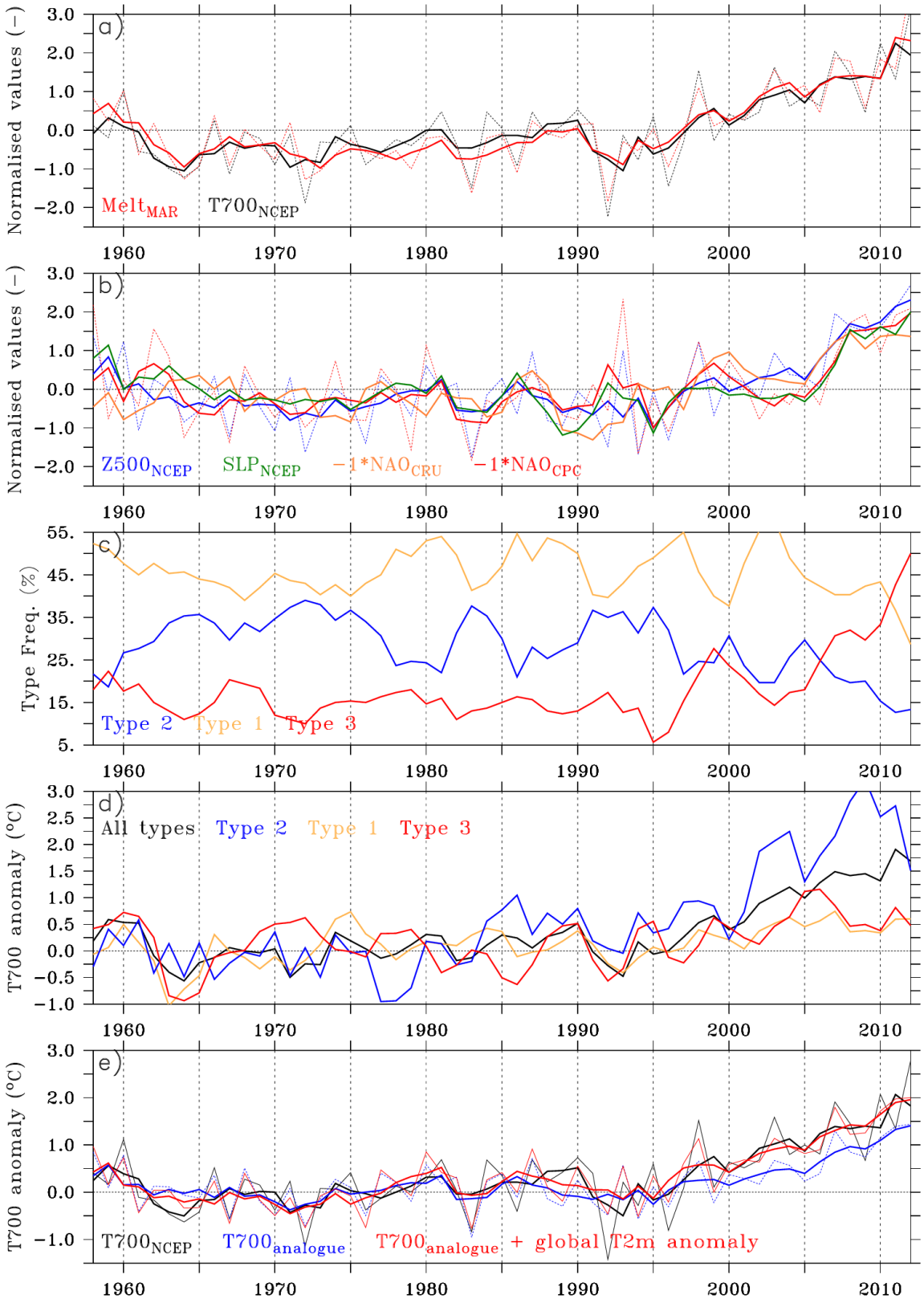

Fig S 1: Same as Fig 1 but using a 3-yr running mean.

2. My second main issue concerns Section 6. I think that showing the GCM NAO's is interesting as such, but I would suggest the authors to reflect on the GCM reliability in terms of present-day atmospheric dynamics first. If none of them is able to resolve the NAO variability (including anomalously negative NAO's) in the current climate, what is then the point to show their future behavior? This would involve much more work, and would require, for example, the application of your analogues method and CTC to the GCM output. In general, I would suggest adaptations to the text to reflect this uncertainty.

The table below lists the min and max JJA NAO index over 1961-1990 from NCEP-NCAR and simulated by 28 CMIP5 GCMs. The min/max is given in normalised value (i.e. divided by the standard deviation over 1961-1990) as well as in hPa. The average and standard deviation (inter-annual variability) of the JJA NAO index over 1961-1990 is also given in hPa. The JJA NAO index is defined here as the JJA sea level pressure difference between the Azores (27 °W, 39 °N) and south-west Iceland (22 °W, 64 °N).

	JJA NAO index over 1961-1990					
	Max	Min	Max	Min	Ave	Std. Dev.
	Normalised by the standard deviation		in hPa			
NCEP-NCAR v1	**1.88**	**-2.29**	**5.03**	**-6.14**	**13.95**	**2.68**
ACCESS1-0	2.16	-1.49	6.12	-4.23	11.18	2.84
ACCESS1-3	1.83	-2.63	6.92	-9.93	12.68	3.78
BCC-CSM1-1	2.14	-1.69	5.59	-4.41	14.08	2.61
BNU-ESM	1.85	-2.04	5.68	-6.26	14.37	3.07
CanESM2	1.71	-1.73	3.62	-3.65	16.11	2.11
CCSM4	1.85	-2.07	4.88	-5.46	15.68	2.64
CESM1-BGC	2.03	-2.41	5.77	-6.86	15.99	2.84
CMCC-CM	1.71	-2.51	5.17	-7.59	11.90	3.02
CNRM-CM5	1.95	-1.89	6.68	-6.49	9.81	3.43
CSIRO-Mk3-6-0	1.98	-2.20	4.76	-5.28	12.58	2.40
FGOALS-s2	2.41	-1.47	6.84	-4.18	9.48	2.84
FIO-ESM	1.89	-2.75	6.09	-8.88	10.87	3.23
GFDL-CM3	1.66	-2.01	5.42	-6.59	13.24	3.28
GFDL-ESM2M	1.84	-2.05	5.81	-6.48	11.59	3.17
GISS-E2-R	2.45	-1.61	5.74	-3.76	7.78	2.34
HadGEM2-AO	1.92	-1.80	5.25	-4.90	12.43	2.73
HadGEM2-CC	1.75	-2.73	4.55	-7.12	11.96	2.61
HadGEM2-ES	1.80	-2.89	4.43	-7.13	11.65	2.47
INMCM4	2.01	-1.41	5.20	-3.64	9.18	2.59
IPSL-CM5A-MR	3.00	-1.49	7.04	-3.50	10.79	2.35
IPSL-CM5B-LR	2.16	-2.03	5.43	-5.10	2.67	2.52
MIROC5	1.90	-2.17	5.65	-6.47	12.06	2.98
MIROC-ESM-CHEM	2.18	-1.80	5.78	-4.77	9.77	2.65
MIROC-ESM	3.06	-1.94	7.73	-4.91	10.77	2.53
MPI-ESM-LR	1.68	-2.19	4.54	-5.91	14.83	2.70
MPI-ESM-MR	2.32	-2.09	5.88	-5.28	14.81	2.53
MRI-CGCM3	1.96	-1.88	7.09	-6.80	8.20	3.61
NorESM1-M	2.09	-1.68	5.57	-4.49	13.54	2.67
CMIP5 mean	***2.05***	***-2.02***	***5.69***	***-5.72***	***11.79***	***2.80***

As you see, most of the GCMs are able to simulate the inter-annual variability of the NAO index over 1961-1990 and extreme negative JJA NAO index values similar to the one "observed" from the NCEP-NCAR reanalysis v1 over 1961-1990. Therefore, we can conclude that most of them are able to simulate such negative NAO values as those currently observed (~ -2 for the normalised NAO) but they fail to simulate the current succession of summers with negative JJA NAO values.

For the evaluation of the CMIP5 GCMs over current climate by using our CTC, we refer to Belleflamme et al. (2012)[1].

Minor comments
P4102
L4: towards increasing melt: place this between 'trend' and 'observed'
L8: since 20 yr: since 1992.
L10: mean temperature from reanalyses
L13: in surface = at the surface
L14: put comma after 1990s
L15: islands = Arctic Archipelago
L17: more frequent than before: this is vague, specify
L18: Greenland and the Ellesmere and Baffin Islands
L24: a succession. . ..: move this to between ' observed' and 'over'
P4103

Thanks for all of these suggestions that will improve the revised manuscript.

L4: It would strengthen the paper even more if you could update this

As we have suggested earlier, the revised version of our paper will include JJA 2012.
The circulation still explains ~ 70 % (resp. ~65%) of the current JJA T700 increase over 1993-2012 (resp. over 1983-2012).

L7: which has = and have
L14: elevation change cannot be in or out of balance
L22: comma after modes
P4104
L1: extracting=that extracts
L12: in the last 50 yr = in a longer term

Thanks.

P4105
L4: Reanalysis 1? Specify

It is the NCEP-NCAR reanalysis version 1. The NCEP-NCAR v2 reanalysis (including assimilation from satellite data) is available over 1979-2012. We will write "Reanalysis v1" in the text.

L4: NCEP also forms an independent dataset, compared to ERA40/ERA-Interim that
are used to drive MAR.
L8-24: This part can be largely improved, first of all by shortening it significantly. Line
17-24 are mostly repetitive statements.

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1 Belleflamme A., Fettweis X., Lang C. and Erpicum M: Current and future atmospheric circulation at 500 hPa over Greenland simulated by the CMIP3 and CMIP5 global models. Climate Dynamics, doi: 10.1007/s00382-012-1538-2, 2012. http://www.springerlink.com/content/m765331048634740/

We will simplify this section and make it more understandable.

L29: both at the surface and at 500 hPa
P4106
L3: has
L7: the sensitivity of our results to the choice of dataset

Thanks

L10: I understand, but you used the “non-homogeneous” MAR results to correlate
NCEP T700 to MAR melt. Please comment.

Indeed, there is a break on 31 Dec 1978 – 1 Jan 1979 in the MAR time series. But, the MAR results are used here only to show the good correlation (0.93) between T700 and the surface melt and therefore this inhomogeneity does not impact the T700-based discussion afterward.

L15-17: try to break this sentence in two, that reads better.
L20: I would reverse the statement: the ice sheet top reaches an altitude above that of
the 700 mbar pressure plane.
L26: delete ‘more’
P4107
L26: in Supplement. Please specify, refer to Table S1.
P4108

Thanks for these suggestions.

L10: less homogeneous? What do you mean?

For each circulation type, a threshold in the similitude index is chosen to build the type. We have fixed here the number of possible circulation types to 3. In our CTC, as justified in Fettweis et al. (2011), if the percentage of unclassified days is lower than 1% after building the last type for a chosen index threshold, these days are included in the last type even if they are not similar. This explains why this last type is less "homogeneous" than the other types.
We suggest to remove this confusing sentence because this does not affect the discussion afterward.

L16: on average
L17-21: too long sentence and vague statements. It says that Type 1 and 2 both
decrease from 15 to 40%? I would also remove the part starting with ‘and in particular’

Indeed, this sentence was not clear.
Type 3 increases from ~15% to 40%
Type 2 decreases from ~35% to 15 %
Type 1 decreases from ~45% to 35%
We will rephrase this sentence and remove the second part of the sentence as you suggest.

L24: remove ‘on the one hand’
L26: on the other hand = Moreover,
L28: at the surface
P4109
L17: is 0.88 with a RMSE . . . and standard deviation of. . .
L19-22: can be removed in my opinion
L20: remove ’successfully’

L23: remove ‘still’
L24: and a standard deviation
P4110
L3: remove ‘according to’ and put Fig.1d between brackets

Thanks for these suggestions.

L15: This step requires some extra lines. Why do you introduce the global mean temperature?

Knowing that the circulation explains only a part (~70%) of the currently observed warming at 700 hPa over Greenland, we use the global mean temperature for evaluating the part of this observed warming coming from the global warming (~30%) and we show that circulation + global warming explain most of the warming over Greenland.

We will introduce better why we use here the global mean temperature.

L20-29: I think that also this part does not contain necessary information. Just state that you can explain almost all variability with adding the “anthropogenic” effect plus the atmospheric dynamics. I think this proves that your method works.

OK, we will considerably reduce this paragraph.

P4111
L1: means=implies that
L6:imply=suggest
L6: remove ‘forcing’
L7: comma after ‘runoff’
P4112
L6: neighbouring Canadian Arctic Archipelago, where . . ..
L7: remove ref to Hanna (2012)
L7: tend to induce a southward flux instead, which explains. . .
L9: remove ‘unlike Greenland. . .’
L13-14: Questionable statement, see above
L15: next step will be. . .

Thanks for these suggestions.

We will reread our text in depth for improving the English language before re-submission. In addition, it should be noted that TC offers now copy editing of all TCD papers.