Dear Editor, Dear Prof. van den Broeke,

Thank you very much for handling the review process of our paper.

We agree with most of the reviewer's remarks and we modified the manuscript accordingly. They contributed to improve our manuscript a lot and we thank them. We have answered to both reviews and Marco Moller's comment and you will find the corresponding documents in the interactive discussion of TCD.

Please also find the revised version of our manuscript with the modifications in green.

We changed the tables and figures to accommodate best with the wishes of the reviewers.

- Table S1 from the supplement has been added to the manuscript
- Figure S3 has been added to figure 5
- For figure 3 and S2, it seemed too much to regroup all the figures in the manuscript. We compromised by:
    - making a separate figure for fig. 3e.
    - showing the variables that explain the evolution of SMB (runoff, temperature, albedo, SWnet) in fig. 3 in the manuscript
    - showing precipitation, SWD and cloud optical depth in the supplement since it is "additional" information and not really crucial to understand the regional evolution of the SMB.

The main concern of all three reviews was the use only one GCM and scenario to force MAR and that we did not stress enough the implication of it. Here are the key point of our answer to that criticism and you can find a more detailed answer in our answer to reviewer#2:

- In the revised version of our paper, we have reminded on why we used MIROC5 instead of just refer to the companion paper.
- We have also motivated the choice of an extreme scenario such as RCP8.5
- We have added a figure comparing the evolution of MIROC5 based near-surface temperature anomaly over Svalbard and compared it to the other CMIP5 GCMs and the ensemble mean. MIROC5 follows the ensemble mean until 2060 and then becomes a little warmer.
- Our goal was not to do an extensive future projections exercise over Svalbard including all GCMs/scenarios but rather to show a possible outcome of the future of Svalbard cryophere and its evolution under a warmer climate. As no atmospheric changes are projected in the future in the Arctic, what we projected to happen in 2100 may happen earlier or later than what we projected but is still expected to happen some time in the future if we use other GCMs.

We also propose to change the title of our paper to specify we made only one future projection if you agree with it:

"Future projection of the climate and surface mass balance of Svalbard with the regional climate model MAR forced by MIROC5-based RCP8.5 scenario".

Finally, running new simulations with other GCMs and other scenarios as forcings would take a huge amount of time and results would not be available before several months. I am now at the end of my PhD that I need to defend in Fall 2015 and I am working on my last project with new MAR simulations at higher resolutions. I trust you understand that I really can not afford to lose precious CPU time or spend several weeks analysing new future projections at this point of my thesis.

On behalf of the authors,
Sincerely,
Charlotte Lang