

Interactive comment on “Greenland ice sheet surface mass balance: evaluating simulations and making projections with regional climate models” by J. G. L. Rae et al.

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We thank D. van As for his comment, and give our response below.

COMMENT: I congratulate the authors with an interesting manuscript. I do have a very short comment though. You mention the difficulty of validating the model results because of the few in-situ data available, especially in the ablation zone of the Greenland ice sheet. I would like to mention that the PROMICE weather station network was installed between 2007 and 2010, and currently counts 20 stations, of which 17 in the ablation zone of the ice sheet. Records of temperature, ablation, and other variables that could help validate regional climate models are available.

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RESPONSE: We agree that we should have mentioned the availability of this data. However, while we expect these observations to be useful for model validation in the future, we believe that at present they do not yet cover a long-enough period of time to be useful for validation in the present manuscript.

Taking account of this comment, we have made the following changes:

- In Section 3.2 (Melt area extent and meltwater production), we have changed "Unfortunately, widespread in-situ observations of meltwater production are not available" to "Unfortunately, while some short time series of observations have recently become available, e.g. from the PROMICE network (van As et al., 2011), there are few widespread, longer-term in-situ observations of meltwater production".
- In Section 3.4 (Surface mass balance (SMB)), we have changed "Evaluation of modelled SMB is difficult because few in-situ observational records exist" to "Evaluation of modelled SMB is difficult because few long-term in-situ observational records exist".
- We have cited the following reference: van As, D., R.S. Fausto and the PROMICE project team (2011), Programme for Monitoring of the Greenland Ice Sheet (PROMICE): first temperature and ablation records, Geological Survey of Denmark and Greenland Bulletin, 23, 73-76.

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