

Interactive comment on “Tilt error in cryospheric surface radiation measurements at high latitudes: a model study” by W. S. Bogren et al.

D. van As

dva@geus.dk

Received and published: 7 December 2015

Congratulations to the authors with this interesting study on tilt errors for measuring shortwave radiation over high-latitude snow and ice. I enjoyed reading the paper.

Within PROMICE we measure shortwave radiation at about 20 locations on the Greenland ice sheet, mostly in the ablation zone where tilt can be (a) large (issue). Your study can therefore be very valuable for our work. I believe there may be ways for your study to become even more useful to the reader, which are presumably people with an interest in measuring shortwave radiation / albedo, or using such data.

First suggestion would be to validate your model study where possible. Quite a few measurements or radiation and tilt have been taken over high-latitude snow and ice. A

C2447

selection of these must be of use to validate various aspects of your results. I realize that you prefer to isolate the issue that is tilt, which is not something that you can do when using measurements. Yet your model does come with its own set of uncertainties, and it is important to have them addressed properly – and the most convincing method is by validation against measurements. You can argue that tilt dominates any other signal in the model, more than those related to e.g. atmospheric assumptions; but likewise you could then argue that tilt errors will dominate in measurements, especially for relatively low zenith angles.

Secondly, I've been working on tilt corrections for weather station measurements, e.g. in Van As D (2011) Warming, glacier melt and surface energy budget from weather station observations in the Melville Bay region of northwest Greenland. J. Glac., 57 (202), 208-220. We also provide our data with a tilt-corrected value. Yet I am sure that there is still much to gain in such corrections. It would be very valuable to anyone measuring shortwave radiation (and sensor tilt), and thus for the impact of your paper, if you could provide an alternate method for tilt correction, to not only point out, but also remedy tilt issues.

Interactive comment on The Cryosphere Discuss., 9, 4355, 2015.

C2448