

The Cryosphere Discuss., author comment AC3  
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## Reply on CC1

Anna Derkacheva et al.

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Author comment on "Seasonal evolution of basal environment conditions of Russell sector, West Greenland, inverted from satellite observation of surface flow" by Anna Derkacheva et al., The Cryosphere Discuss., <https://doi.org/10.5194/tc-2021-170-AC3>, 2021

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Dear Dr. Koziol,

Thank you for your attention to your manuscripts and the given feedback. We carefully discussed your comments with the co-authors. We agreed with you that several of our statements misinterpret your results or are written in a misinterpreting way themselves. We will reformulate several paragraphs with respect to your remarks.

In particular, you ask that we reconsider our conclusions that the study from Koziol and Arnold (2018) concluded that a power law was 'best suited' to describe the basal conditions in this sector of Greenland, while we would advocate for Schoof/Gagliardini sliding law.

We agree with your request. Indeed, in Koziol and Arnold (2018), you consider both a general power and Schoof/Gagliardini sliding laws, with similar results for both laws. We are sorry to have overlooked this aspect of your work, which is therefore poorly reflected in our study. In the revised manuscript, we will include the fact that Koziol and Arnold (2018) used both Schoof/Gagliardini and Budd (power law) sliding laws and we will change the paragraph in the conclusion as:

*... This finding differs from previous results for this region by including both hard-bed (often modelled in a coupled hydrology-ice-flow system with a general power law of the form  $\tau b = CnNun b$ ; see, e.g. (Koziol and Arnold, 2018)) and soft-bed (usually modelled with a pure Coulomb law of the form  $\tau b = CN$ ; see, e.g. Bougamont et al. (2014)) physics. Indeed, with the proper set of coefficients, depending on their calibration, our model of regularized "Coulomb" friction provides a complete description of both hard and weak regimes of the bed physics.*

A. Derkacheva and co-authors