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Dear Dr. East,

My co-authors and I are writing to submit a manuscript titled: "Modeling Sediment Fluxes from Debris-Rich Basal Ice Layers," for consideration in JGR: Earth Surface. We confirm that this work is original and has not been published elsewhere, nor is it currently under consideration for publication elsewhere.

In this paper, we quantify a novel process of sediment transport, in which sediment beneath a glacier becomes entrained in basal ice layers and delivered to the terminus as the glacier slides along its bed. We present the first numerical model able to capture this behavior and reproduce observed layering in debris-rich ice at glacier margins. In addition, we present a new set of field observations from Mendenhall Glacier, in Juneau, AK, and use those observations to inform and validate the model's predictions. In doing so, we quantify the sediment flux through the terminus from debris-rich glacier ice and place this process into the broader geologic context of the glacier, proglacial lake, and surrounding landscape.

We believe this manuscript is consistent with the Aims & Scope of JGR: Earth Surface as it seeks to develop our understanding of the processes and patterns of glacial sediment transport and carries important implications for sediment delivery to riverine, periglacial, and coastal environments. Recent related work published in JGR: Earth Surface has been received well by the community, including "Characterizing Sediment Flux of Deforming Glacier Beds" (Hansen and Zoet, 2022) and "Morainal Bank Evolution and Impact on Terminus Dynamics During a Tidewater Glacier Stillstand" (Eidam et al., 2022).

The authors have no conflicts of interest to disclose. Please feel free to address any correspondence concerning this manuscript to me at ethan.pierce@colorado.edu.

Thank you for your consideration of this manuscript.

Sincerely,

Ethan Pierce