



Supplement of

Heterogeneous CO₂ and CH₄ content of glacial meltwater from the Greenland Ice Sheet and implications for subglacial carbon processes

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Supplementary Information

Sampling location photos and detailed descriptions

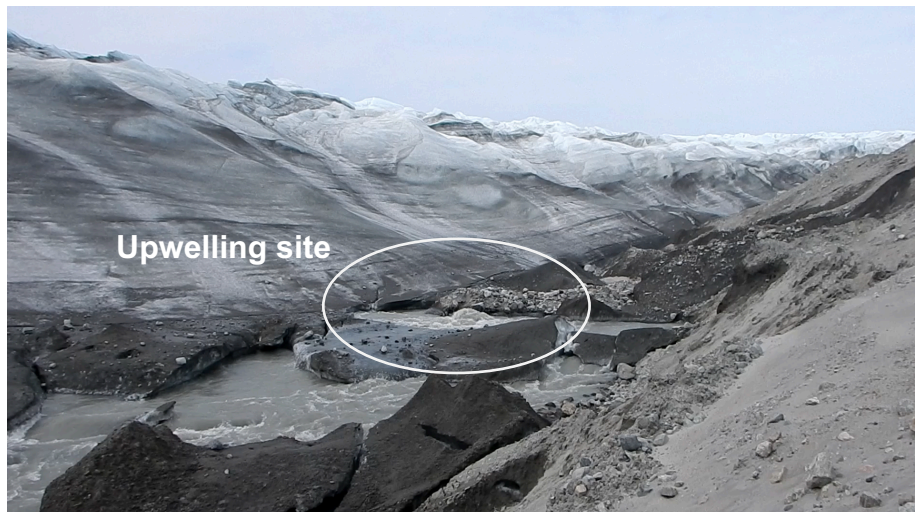


Figure S1. IS sampling site (photo taken July 15th, 2018), facing ENE

Isunnguata samples were collected from a site downstream of Point 660 (67° 9'25.43"N, 50° 3'29.83"W) where water flows from a subglacial discharge site. No flow occurred further upslope of a subglacial upwelling, which was most clearly observed during the peak melt season (photo taken July 15th, 2018), suggesting it is the principal water source to the stream. As indicated by the photo, the water contains high concentrations of suspended sediment and is predominantly subglacial, with only minor observed contributions of supraglacial meltwater. This location is very close to the site discussed in Christiansen and Jørgensen (2018), where high atmospheric CH₄ concentrations were interpreted to reflect CH₄ supersaturation of the subglacial meltwater discharged at this site.



Figure S2. RU sampling site, photo taken on July 22nd, 2018, facing NE

Russell Glacier water samples were collected just downstream of the above pictured ice wall and thus water did not flow through any lakes directly in between the glacial outlet and the sampling location in this segment of the stream. While sampled water is a combination of recently discharged subglacial meltwater from under the Russell Glacier and proglacial discharge from further upstream (contributions from the Isunnguata at point 660 and other subglacial outlet sites as this segment of the river flows long the toe of the Russell glacier), gas concentrations are out of equilibrium with respect to atmospheric concentrations, suggesting the gas signal reflects subglacial processes because sites just upstream of this site are close to equilibrium with respect to atmospheric CO₂ and CH₄, with distinct increases in CH₄ concentrations downstream of the ice wall, indicating subglacial water contributions. While we did not include sites upstream of the RU glacial discharge site in this paper, gas concentrations at upstream locations can be found at [doi:10.18739/A2PC2T94](https://doi.org/10.18739/A2PC2T94).



Figure S3. KS sampling location (photo taken June 16th, 2017), facing NE

The Kiattut Sermiat (KS) sampling location occurred as close as possible to the glacier outlet, seen in the center background in the picture above. The distance between the glacial outlet and our sampling site is roughly 1 km. Water flowed through a proglacial lake prior to arriving at our sampling location, which impacted the residence time of subglacial discharge and potential for interaction with the atmosphere between the time of discharge and the time of sampling.