

EGU2020-14759

<https://doi.org/10.5194/egusphere-egu2020-14759>

EGU General Assembly 2020

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In-situ basal melt rate distribution of the floating tongue of 79°N Glacier, Greenland

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The 79°N Glacier (79NG) in northeast Greenland, one of the last glaciers in Greenland with a floating ice tongue, plays a crucial role for buttressing the North-East Greenland Ice Stream (NEGIS). Remote-sensing studies indicate high basal melt rates (> 50 m/a) near the grounding line but these methods are limited by the hinge zone, where the floating ice is not in hydrostatic equilibrium. As part of the Greenland Ice Sheet Ocean Interaction (GROCE) project, we have performed a dense grid of repeated measurements with a phase-sensitive radio echo sounder (pRES) accompanied with autonomous pRES (ApRES) stations to estimate basal melt rates focusing on the hinge zone of 79NG. For analysing the pRES measurements, we additionally used ice thickness information derived from AWI's ultra-wideband radar (UWB) revealing steep channels at the base. The estimated basal melt rates downstream the hinge zone are approximately the same as satellite-derived melt rates. In the hinge zone we found by far larger basal melt rates exceeding 100 m/a next to basal channels.