



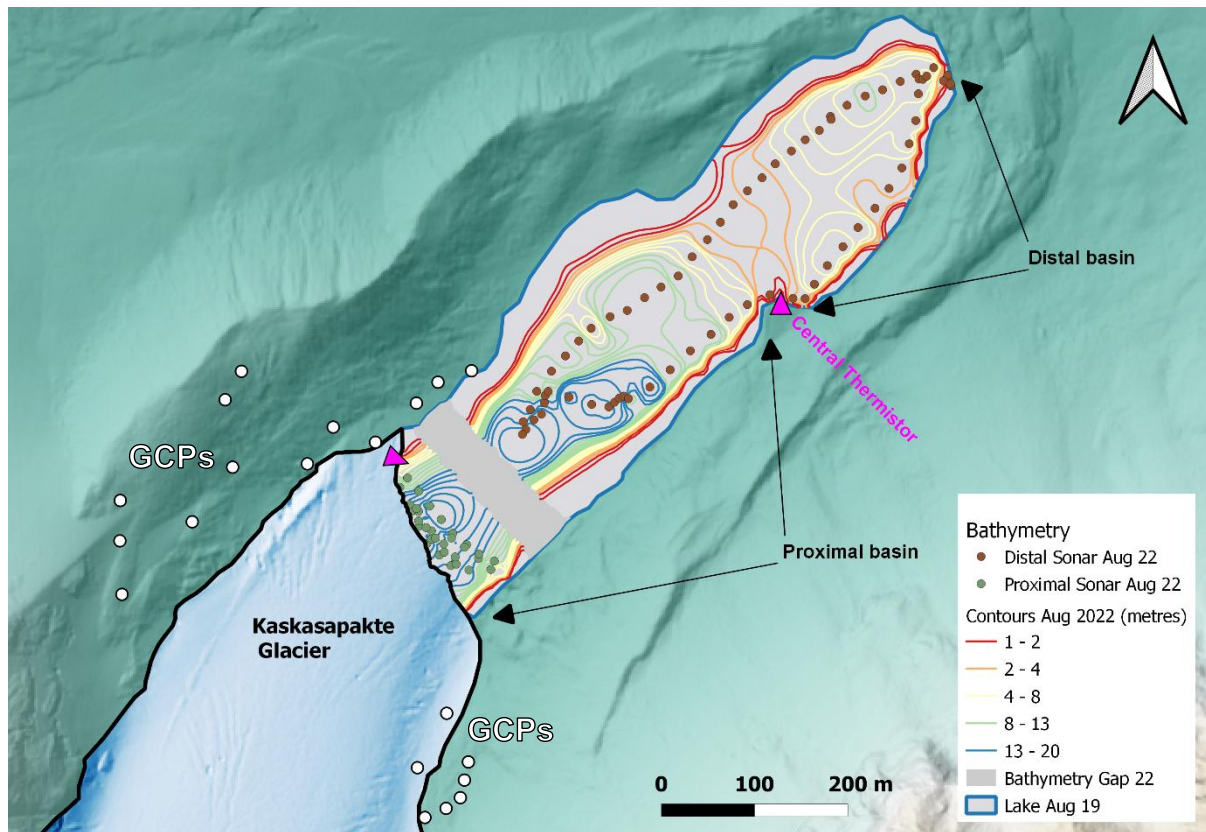
*Supplement of*

**Warm proglacial lake temperatures and thermal undercutting enhance rapid retreat of an Arctic glacier**

**Adrian Dye et al.**

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**Figure S1 - Digital Elevation model with outline of Kaskasapakte Glacier from 3<sup>rd</sup> August 2019 and bathymetry from sonar surveys (sampled at 30 seconds) in August 2022. Ground control points (GCPs) (19/8/2019) used for SfM model are shown as white dots. Thermistor positions shown as pink triangles.**

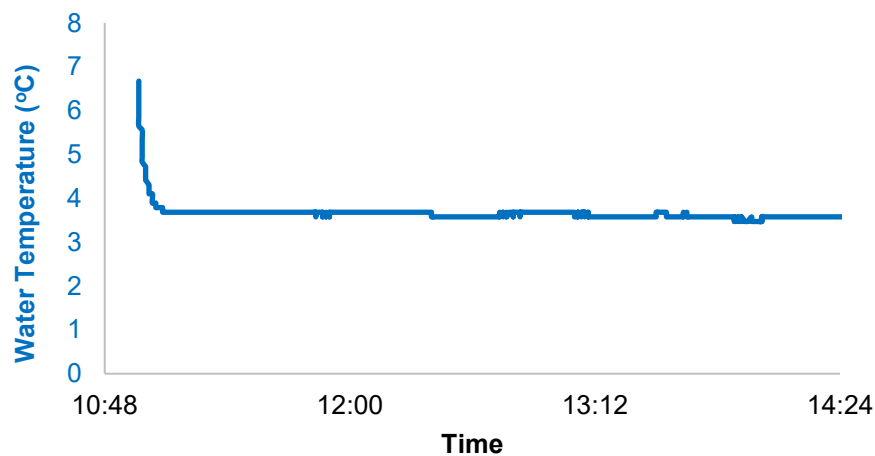
**Table S1– Calving classification from July 2017 timelapse imagery (observations every minute from 17:43 on 24<sup>th</sup> July until 14:21 on 28<sup>th</sup> July). 1 = ice fall; 2 = sheet collapse; 3 = stack topple; 4 = waterline; 5 = subaqueous; 6 = roof/arch collapse; and 7 = unknown.**

Date	Time	Calving Class	Notes
24/07/2017	20:50	7	Berg from englacial conduit
24/07/2017	20:53	7	Berg from englacial conduit
25/07/2017	05:45	4	
25/07/2017	16:21	7	Berg from englacial conduit
25/07/2017	16:31	7	Berg from englacial conduit
25/07/2017	19:27	7	Berg from englacial conduit
26/07/2017	00:03	4	
26/07/2017	02:03	2	
26/07/2017	04:21	2	
26/07/2017	09:42	2	
26/07/2017	09:42	6	
26/07/2017	09:42	4	
26/07/2017	10:57	6	
26/07/2017	18:34	7	Berg from englacial conduit
26/07/2017	19:53	7	Berg from englacial conduit
26/07/2017	20:44	7	Berg from englacial conduit

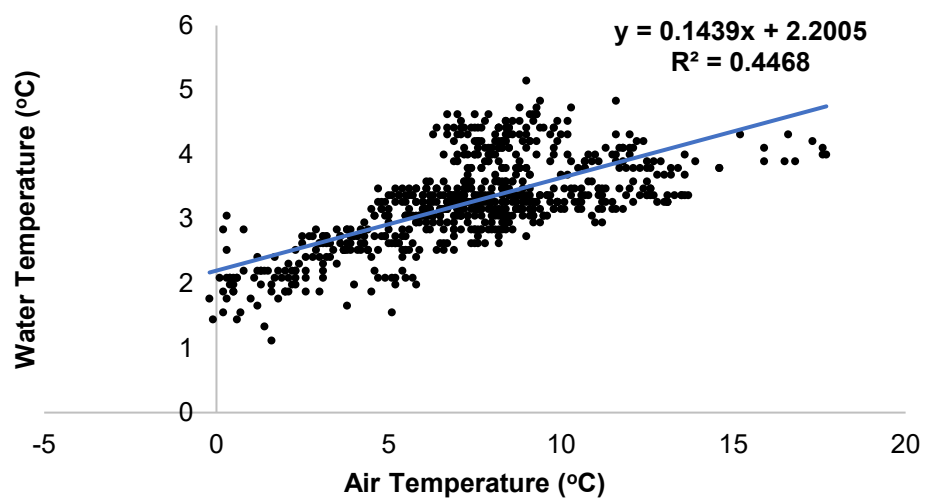
26/07/2017	21:36	7	Berg from englacial conduit
26/07/2017	23:29	7	Berg from englacial conduit
27/07/2017	16:50	7	Berg from englacial conduit
27/07/2017	20:52	7	Berg from englacial conduit
27/07/2017	23:59	7	Berg from englacial conduit
28/07/2017	11:44	7	Berg from englacial conduit



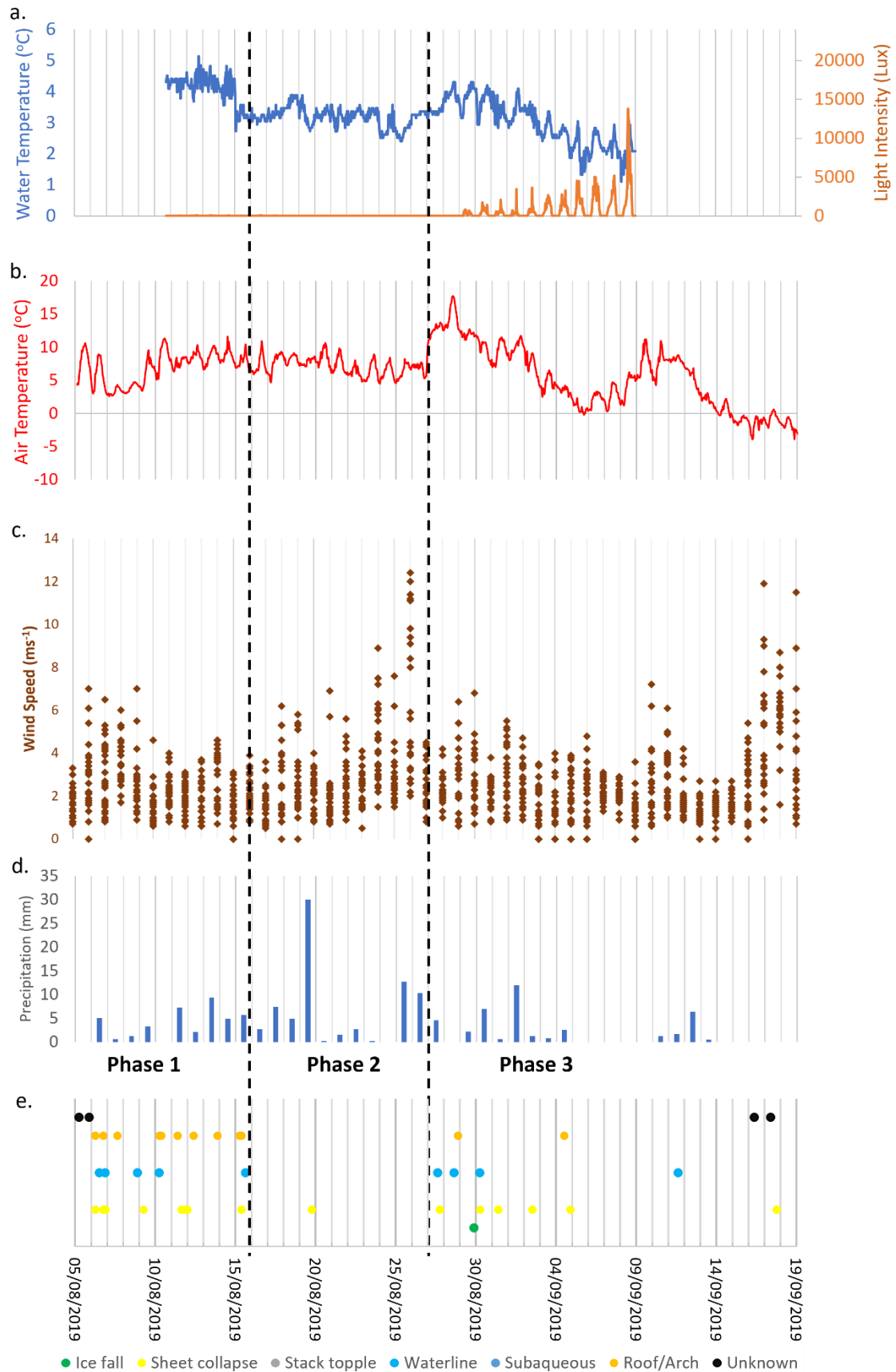
**Figure S2 – Image of Kaskasapakte glacier terminus 4<sup>th</sup> August 2019, taken from western moraine crest on Panasonic Lumix (DMC-TZ57) (focal length 12 mm; exposure time 1/800 sec). Note the water filled crevasse in the lower right of the image (blue circle).**



**Figure S3 – Water Temperature ( $\pm 0.5$  °C) at 20m depth from temporary cast in front of glacier terminus on 8<sup>th</sup> August 2019. Note that immersion time was 10:51, with several minutes of sensor settling time afterwards.**



**Figure S4 – Water temperature from 5m depth at central point in Kaskasapakte lake against 2m air temperature at Tarfala Research Station (SMHI).**

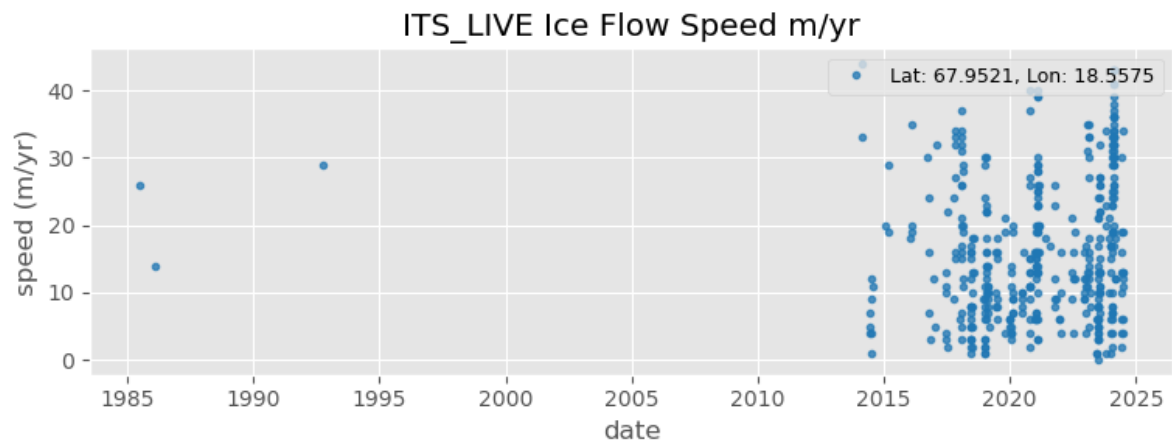


**Figure S5 – a. Water temperature (from 5m deep at central part of lake) and b. hourly air temperature (from Tarfala), c. wind speed d. daily precipitation (Tarfala; SMHI) and e. calving classification from timelapse from 5th August to 19<sup>th</sup> September 2019.**





Figure S6 Image of Kaskasapakte and proglacial lake taken in a. 1988 (photo; V. Pohjola) and b. 2019 (photo; A. Dye). Yellow line = lateral margin. Red circle = snow patch for reference marker. Note the emergence of supraglacial debris bands near the ice front.



**Figure S7. Summer (1<sup>st</sup> July to 15<sup>th</sup> September) point ( 67.9521 N, 18.5575 E) surface velocities derived from NASA ITS\_LIVE feature tracking for central part of KG lower ablation area.**