

## Supporting information



Figure S1: eBee Plus fixed-wing UAV (a), Huaxing A10 GNSS GPS for PPK base station (b), DJI Phantom 4 RTK rotary-wing UAV (c), DJI D-RTK 2 for RTK base station (d).

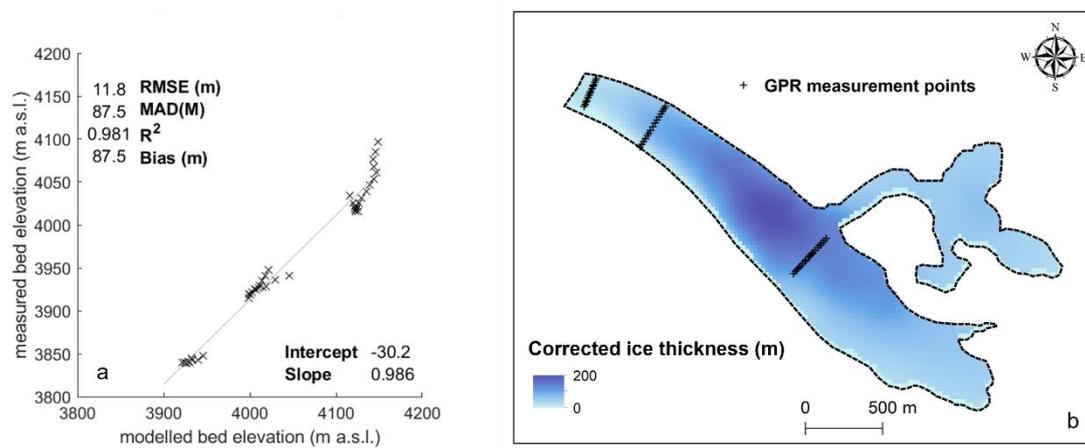


Figure S2: The fitting correction to the Farinotti et al (2019) dataset based on 24K Glacier GPR data (a)spatial distribution of corrected ice thickness and GPR measurement points (b).

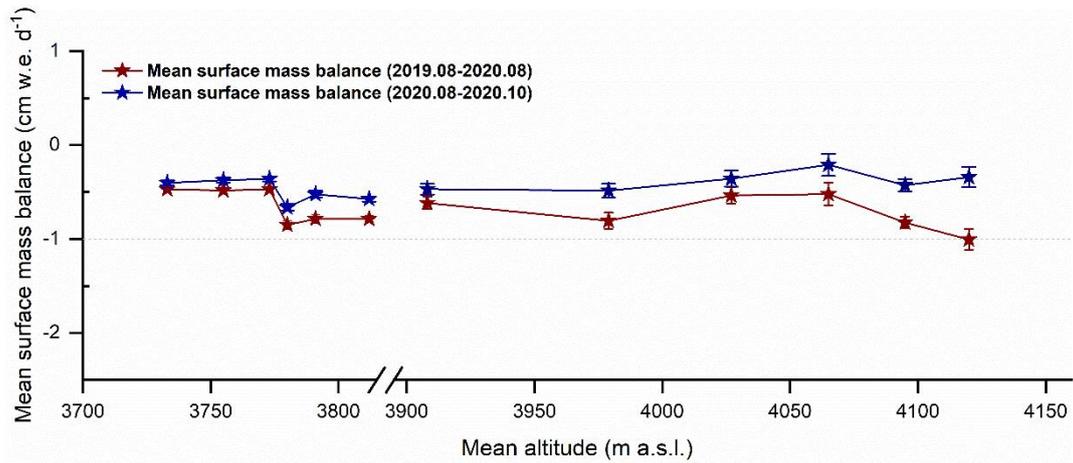


Figure S3: The daily mean SMB and its uncertainties for the individual zones of the two glaciers during the cold period (blue solid line) and the annual timescale (red solid line).



Figure S4: *In-situ* photographs for 24K Glacier terminus area



Figure S5: *In-situ* photographs for 23K Glacier upper area and a captured paraglacial slope failure (PSF) event.