Supplement of

Brief communication: Supraglacial debris-cover changes in the Caucasus Mountains

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Table S1. Satellite images used in this study.

Date	UTM zone	Type of imagery	Region/Section	Resolution	Scene ID
10/08/1985	37N	Landsat 5	Western Greater Caucasus	30 m	LT51720301985222XXX04
06/08/1986	38N	Landsat 5	Central Greater Caucasus	30 m	LT51710301986218XXX02
31/08/1986	38N	Landsat 5	Eastern Greater Caucasus	30 m	LT51700301986243XXX03
12/09/2000	37N	Landsat 7 ETM+	Western Greater Caucasus	15/30 m	LE71720302000256SGS00
05/09/2000	38N	Landsat 7 ETM+	Central Greater Caucasus	15/30 m	LE71710302000249SGS00
28/07/2000	38N	Landsat 7 ETM+	Eastern Greater Caucasus	15/30 m	LE17003020000728SGS00
23/08/2013	37N	Landsat 8	Western Greater Caucasus	15/30 m	LC81720302013235LGN00
03/08/2014	38N	Landsat 8	Central Greater Caucasus	15/30 m	LC81710302014215LGN00
28/08/2014	38N	Landsat 8	Eastern Greater Caucasus	15/30 m	LC81700302014240LGN00
20/08/2016	37N	SPOT-7	Elbrus	1.5 m	DS_SPOT7201608200751063

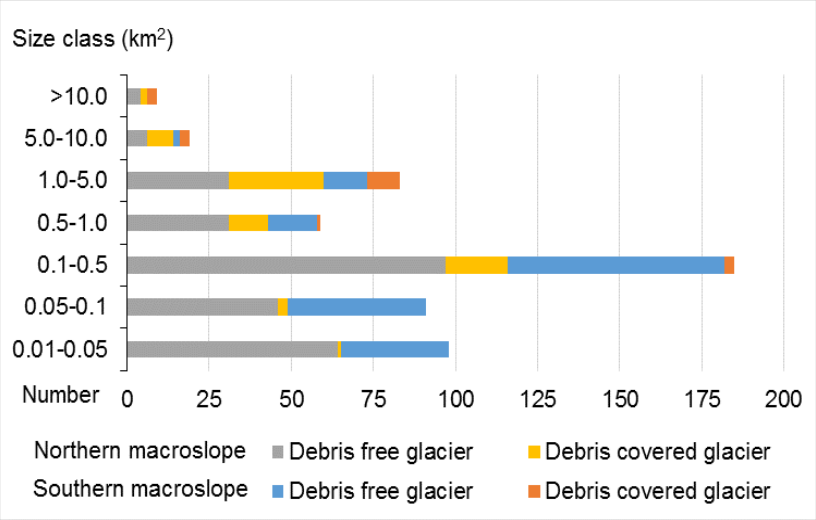

Figure S1. The Greater Caucasus glacier size classes with debris covered and debris free glaciers distributions for northern and southern slopes.

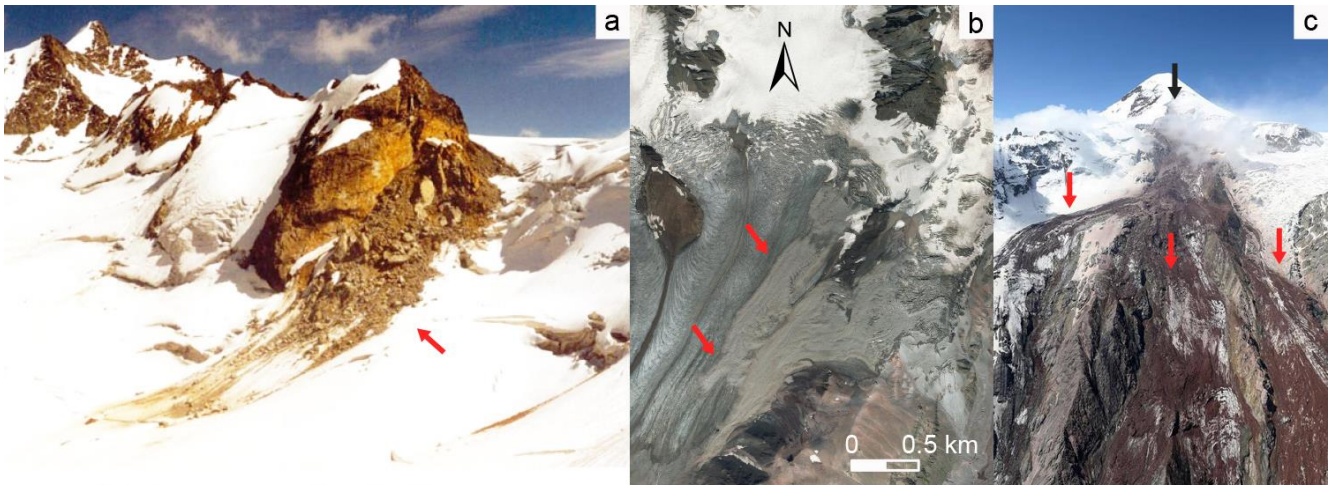

Figure S2. a – Djankuat (2001), b – Suatisi (2007, 2010), and c – Devdoraki (2014) glacier rock falls. Red arrows show the flow of the rock-ice avalanche. The black arrow shows the center of genesis of the rock-ice avalanche (4600 m asl).

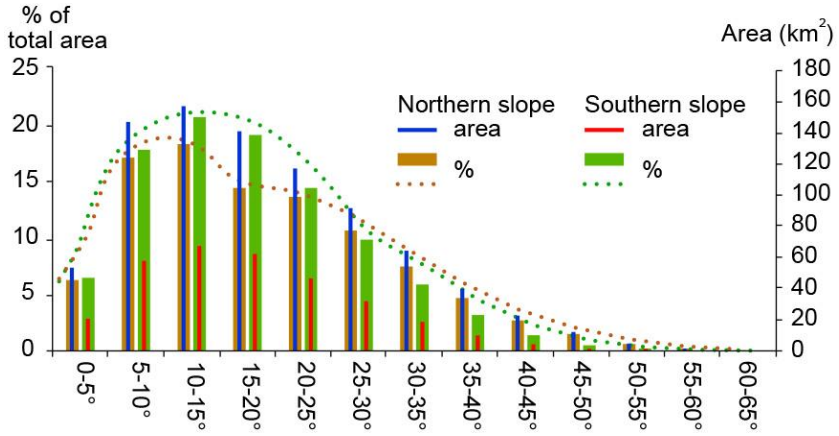

Figure S3. Greater Caucasus total glacier surface inclination for northern and southern slopes based on ASTER GDEM.

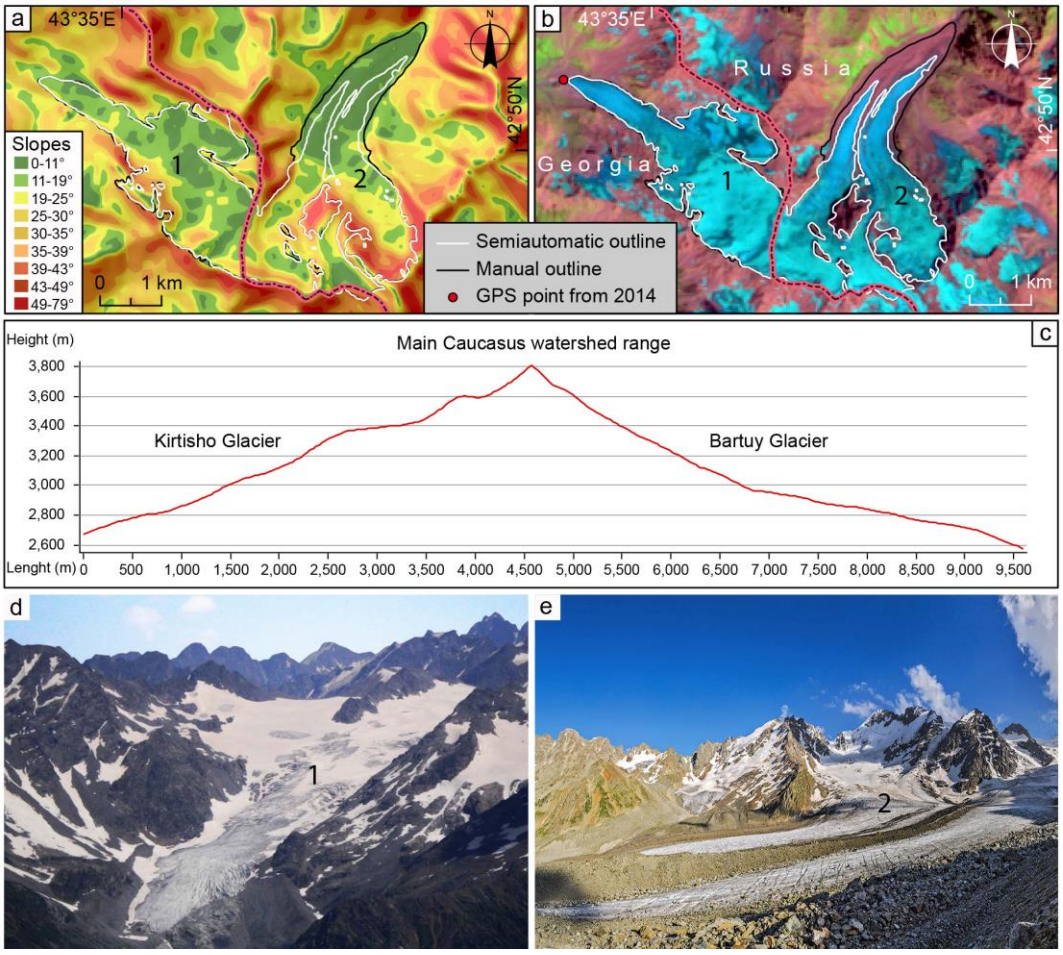

Figure S4. a1 – Kirtisho and a2 – Bartuy glaciers slope inclination map based on ASTER GDEM; (b) the manual and semi-automated outlines comparison and SDC assessment, Landsat 8 (3/08/2014); c – Kirtisho and Bartuy glaciers longitudinal profile based on ASTER GDEM; d – Kirtisho Glacier in 2010 (photo by L.G. Tielidze); e – Bartuy Glacier in 2014 (photo by M. Golubev).

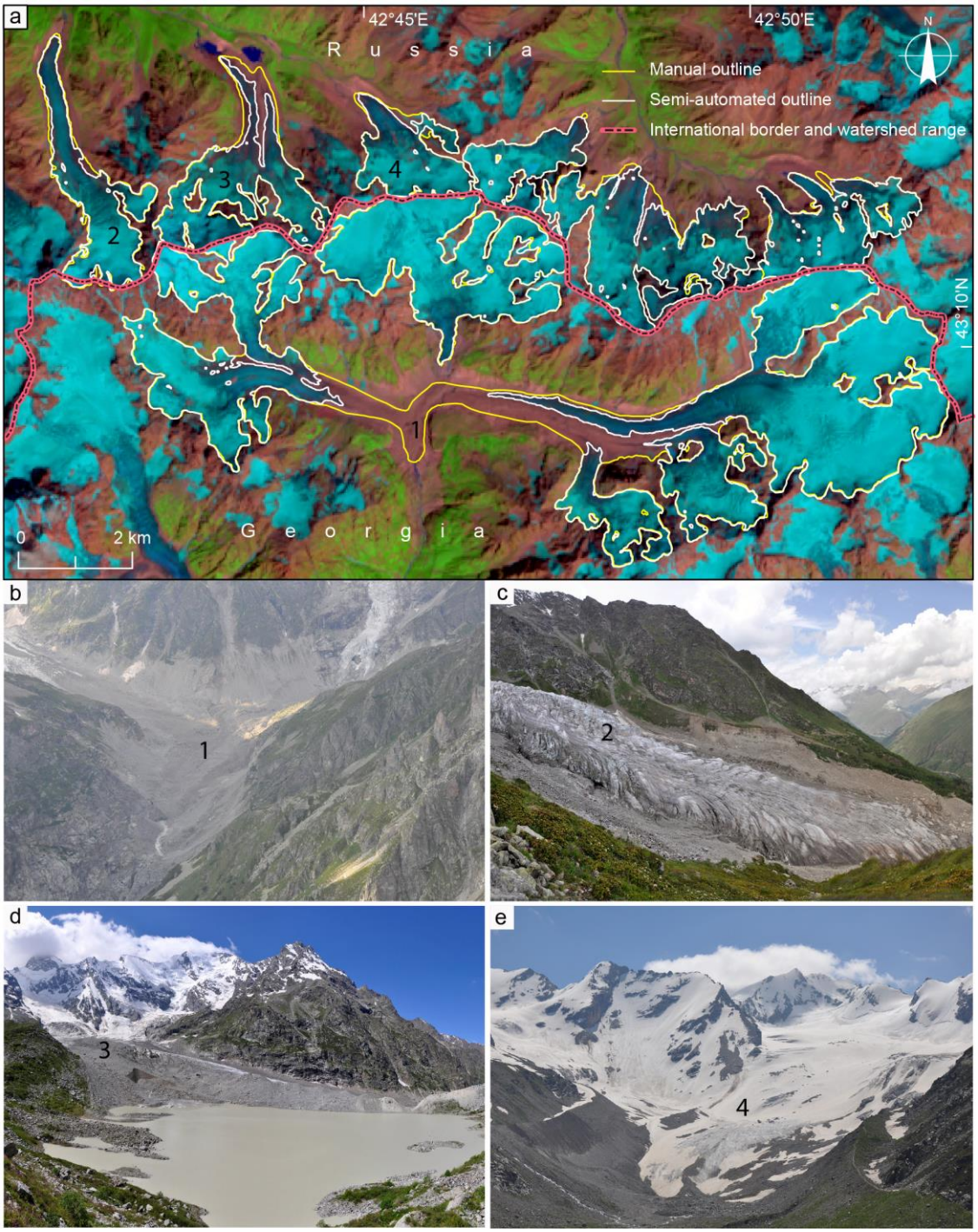

Figure S5. a – Manual and semi-automatic outlines comparison and SDC assessment for the southern (Lekhziri, a1) and northern (Kashkatash a2, Bashkara a3 and Djankuat a4 glaciers (Landsat 8 OLI 03/08/2014); b – Lekhziri Glacier tongue in 2011; c – Kashkatash Glacier tongue in 2014; d – Bashkara Glacier tongue in 2014; (e) Djankuat Glacier in 2014.

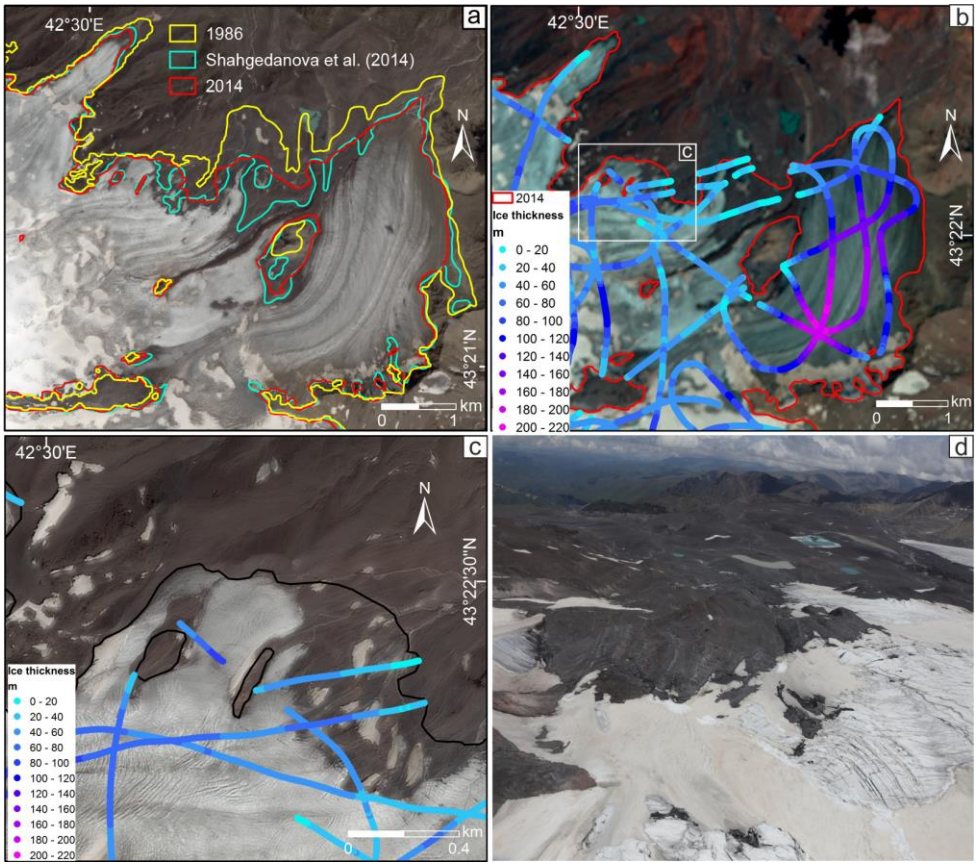

Figure S6. Glaciers of the eastern slope of Elbrus. a – glacier outlines of 1986 and 2014. Red outline shows glacier margins after GPR measurement. SPOT-7 image used as a background; b – Ice thickness profiles obtained during aerial GPR survey in 2014, Landsat 8 image of 2014; c – glacier outlines and ice thickness profiles with SPOT-7 high resolution image; d – oblique photograph of the glacier tongues taken from helicopter in 2014.

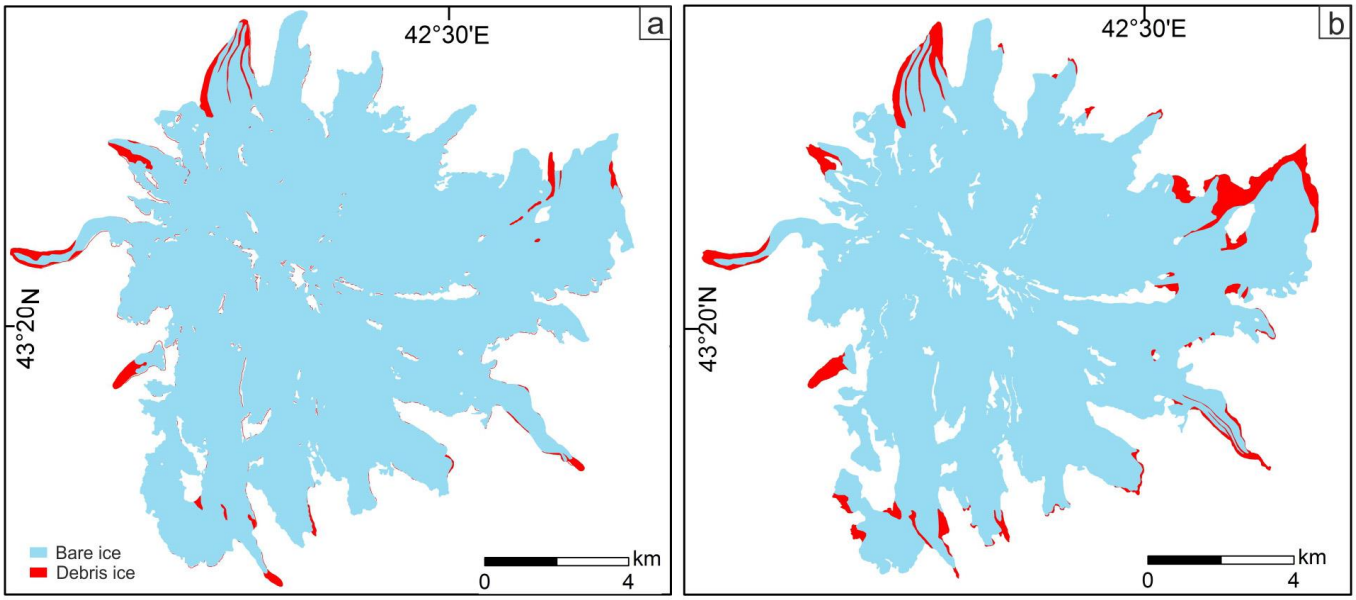

Figure S7. Debris cover increase on the Elbrus massif from 1986 (a) to 2014 (b).

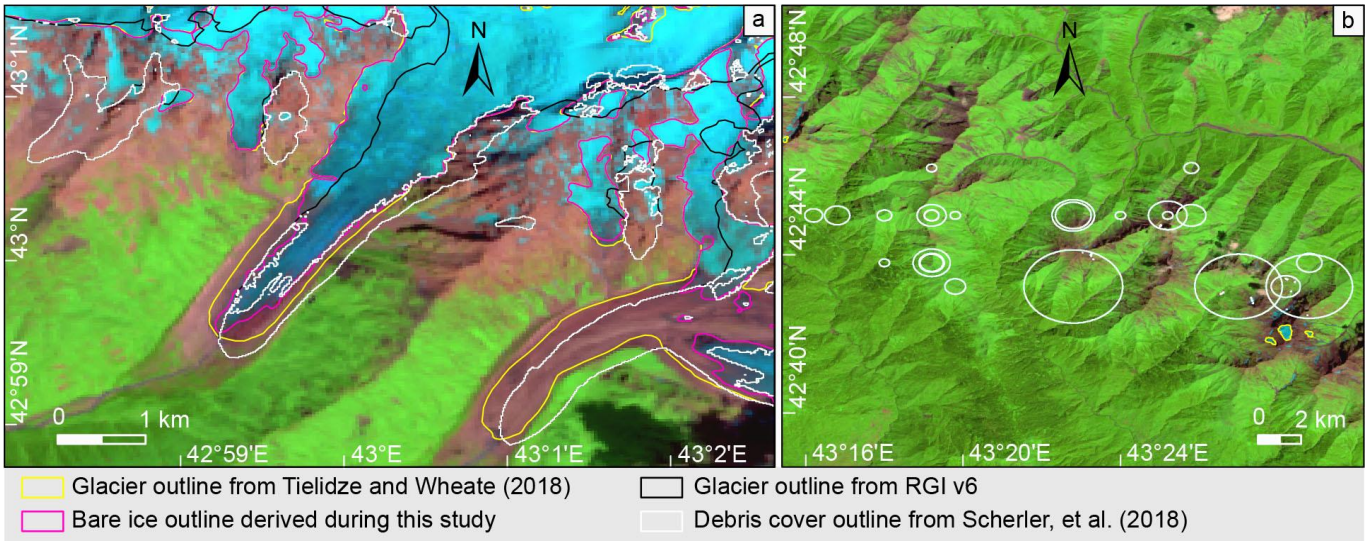

Figure S8. a - An example of the RGI v6 data inconsistent registration; b - An example of the RGI v6 nominal glaciers (circles). Landsat 8 image 03/08/2014 is used as the background.