# Supplementary Material — "Ice thickness distribution of all Swiss glaciers based on extended ground penetrating radar data and glaciological modeling"

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## Overview

This document provides illustrations and tables as supplementary material to the publication "Ice thickness distribution of all Swiss glaciers based on extended ground penetrating radar data and glaciological modeling". All material is based on data which are available in the SwissGlacierThickness-R2020 data package (Grab et al., 2020), except some ice thickness data measured with GPR which were already published by various researchers on GlaThiDa 3.0.1. (GlaThiDa Consortium, 2019), and ice thickness data from two GPR campaigns (Sharp et al., 1993; Huybrechts et al., 2008).



Figure S1: Reproduced after Fig. 1a of the main manuscript: Glacier outlines of the SGI 2016 (after GLAMOS, 2020b) coloured in blue for glaciers for which no GPR data exists and in red for glaciers with GPR data. Closeups to regions A to G are provided below in Figures S2-S8. Background: Hillshade from swissALTI3D after Swisstopo (2019)

### 1 Glaciers with- and without GPR data

Here, a more complete version of table 2 presented in the main study is given. For computing the interpolated ice thickness distributions and glacier bed topography maps, all available GPR data has been used (Table S1), except the data recored in spring 2020. For the spring 2020 data, see data sets cited by [9] in Table S1 and the data sets for which a profile length is given in Table S2.

Table S1: List of glaciers for which GPR data were used for ice thickness modelling. The following information is provided: areas according to the SGI2016 (*A*), volumes ( $V_{2016}$ ), mean thickness ( $h_{mean}$ ) and maximum thickness ( $h_{max}$ ) of the interpolated ice thickness distributions, mean distance to closest GPR point ( $d_{mean-gpr}$ ), total profile lengths (p. length), year of the GPR survey, and the corresponding references of the GPR data. For discussion of this table see main study

(hm <sup>2</sup> )         h <sub>max</sub> (m)         h <sub>max</sub> (m)         (m)         (m)         year(s)         references <sup>1</sup> B56/07         Germer         41.2         3.71         91         385         81.0         34.4         1998.2009.2011         [13,61,27]           B56/07         Germer         41.2         3.71         91         385         81.0         34.4         1999.2012         [13,14,17]           A54/11         Unternar         2.7         2.85         12.6         377         285         2.07         1085.202.012         [13,21,22]           A54/03         Nhone         14.6         1.46         99         410         13.0         2.003.2008         [14,19]           A51/13         Npetli         1.2.6         1.2.8         1.2.4         426         2012.2017         [8,16]           B55/03         Findelen         1.3.0         1.0.2         91         22.8         2.6.2         2008.2012.2017         [8,12].6]           B5/03         Findelen         1.3.0         1.0.2         91         2.2.5         2.5.2         2001.200.201.2017         [8,12].6]           B5/03         Findelen         1.3.0         1.0.2         91.2.2.2.1         4.1.3         1.0	SGI-id	Glacier Name	A	$V_{2016}$	Interpolati	on	$d_{\rm mean-gpr}$	, p. length	GPR survey	GPR survey
BASC-0Consort Alers78.511.7014.779.432718.61956.00113.14.16.1712.14.16.17BACO7Fischer29.83.521743764834.41990-201211.21.4.16.17BAJC0Horterar2.72.8512637728529.71086-200.20121.19.2.12BAJC0Horterar1.61.469.041918.130.22005.201.201.2011.19.1.2BAJC0Corbassier1.491.228224742531.41981.900.11.201.2011.6.1.2BAJC0Corbassier1.491.027026532.220.62005.201.201.70118.1.2BAJC0Dorteratsch1.391.017420622.425.52001.2002.201718.131BASC20Morteratsch1.391.017420621.61.5.22001.2002.201718.112BASC20Morteratsch1.390.66.12.02.52001.2002.201718.112BASC20Morteratsch1.390.788.22.61.5.22001.2002.201718.112BASC20Morteratsch1.390.788.22.61.5.22001.2002.201718.112BASC20Morteratsch1.390.782.52001.2002.201718.1121.5.2BASC20Morteratsch1.390.62.53.61.6.22.61.6.22.62.62.62.62.6			(km <sup>2</sup> )	(km <sup>3</sup> )	$h_{\mathrm{mean}}(m)$	$h_{\max}(m)$	(m)	(km)	year(s)	$references^1$
B56/07         Gorner         41.2         3.71         91         385         810         34.4         190212         [12,14,16,17]           A54g/11         Unternar         2.8.5         117         347         64.8         17.8         2011         [16,26]           A54/11         Unternar         2.7.         2.8.5         2.9.7         108002,012         [1,19,21,22]           A514/10         Huef         1.2.6         1.2.3         10.4         30.5         16.0         18.4         2003,2006         [4,19]           A514/10         Huef         1.2.6         1.2.3         10.4         30.5         16.0         18.4         2003,2001         [8,17,31,21]           B50/03         Findelen         1.3.9         1.0.1         7.4         2008,2012,2017         [8,16]           B50/03         Findelen         1.3.9         1.0.1         7.4         2002,2008,2012         [6,19]           B45/22         Trift         1.4.6         0.80         5.5         32.4         2.6         2.6.5         2007,2010,2016,2017         [8,11,25]           B42/27         Oremma         1.6.0         0.7.8         5.8         2.0.8         7.4         3.0.0,201,201,2016,2017 <t< td=""><td>B36/26</td><td>Grosser Aletsch</td><td>78.5</td><td>11.70</td><td>147</td><td>794</td><td>327</td><td>118.6</td><td>1958,2009,2011</td><td>[3,16,27]</td></t<>	B36/26	Grosser Aletsch	78.5	11.70	147	794	327	118.6	1958,2009,2011	[3,16,27]
B40/07Fiescher29.83.521.174.376481.7.82010[16,26]B43/03Rhone1.4.61.469941918130.2203008[4,19]B43/03Corbassier1.4.61.2.61.2.310410510618.42018[8]B33/03Corbassier1.4.91.2.2822.4742.531.41998,2011[7,16]B56/01Oberaletsch1.4.91.0.26233220.82012,2017[8,16]B55/03Findelen1.3.91.017.420625429.52001,2002,2017[8,13]B56/04Oberaletsch1.3.91.017.420625423.62002,2012,2017[8,13]B56/05Vinteralsch1.4.90.90612.52.5.52001,2002,2012,017[8,13]B56/08Vinteralsch1.4.90.8622.52.5.52001,2002,2012[16,19]B56/04Vinteralsch1.5.60.782.65.31.61.7.52000,201,2017[8,11,25]B66/05Vinteralsch0.785.32.62.7.72.011,2016[8,11,25]B56/04Retal1.5.80.781.63.42.02.61.6.9B57/04Retal1.5.80.66.82.7.77.62.02.1.11.6.20B57/04Retal1.5.87.63.5.33.62.02.1.21.6.1	B56/07	Gorner	41.2	3.71	91	385	810	34.4	1990-2012	[12,14,16,17]
A54g/11Unternar22.72.851.263.772852.9.7108.002.012[1,19,21,21]A51a/10Huefi1.2.61.2.31.0430516018.42003.2006[4,19]A51a/10Huefi1.2.61.2.31.0430516018.42003.2001[7,16]B36/00Oberaleston1.7.11.2.0822.4.74.2.531.41988.1998.2011[7,16]B35/05Trutt1.4.81.0.2702.65322.0.82012.2017[8,16]A55/13Alpetli1.2.01.0.2912.8.1.4.64.6.52008.2012.2017[8,13]B56/03Findelen1.3.91.0.1742.062.8.22.6.2.002.000.2017[8,13]B56/03Findelen1.2.50.7.8822.6.2.5.2009.2012.010.101[8,11]B62/05Zinal1.3.50.7.8822.6.3.6.1.7.52007.2010.2016.017[8,11]B54/04Pittimani1.0.70.6.66.12.102.1.71.8.12016.2017[8]B54/04Pittimani1.0.80.5.75.81.6.11.6.82.0.9.2013.017[8]B54/04Pittimani1.0.80.5.74.13.0.84.12.0.9.2013.012[16,19]B54/04Pittimani1.0.80.5.73.0.44.12.0.9.2013.012[8]B54/04Pittimani1.0.80.5 </td <td>B40/07</td> <td>Fiescher</td> <td>29.8</td> <td>3.52</td> <td>117</td> <td>437</td> <td>648</td> <td>17.8</td> <td>2011</td> <td>[16,26]</td>	B40/07	Fiescher	29.8	3.52	117	437	648	17.8	2011	[16,26]
B42)03Rhone1.461.461.461.4118130.220.00%[4,19]B33/04Orbassier1.4.91.2.28.22.4742.531.41989,20.11[7,16]B35/05Zmutt1.4.81.0.26.82.2.235.074.42009.20.11.20.17.1018.3.7.3.1.3.2B57/05Zmutt1.4.81.0.29.12.5.23.5.220.820.12.20.17[8,16]B55/03Findelen1.3.91.0.17.42062.5.42.9.52001.2002.20.17[8,13]A54/24Trift1.4.60.805.53.242.263.3.22001.2002.20.17[8,13]A54/24Trift1.4.60.805.23.2.42.0.22008.20.12.01.7[8,11.6]B63/05Zinal1.3.50.7.85.22.5.420.620.00.20.12.01.7[8,11.6]B63/05Zinal1.3.50.7.85.32.8.22.6.20.1220.12[16,19]B52/27Orenma1.5.0.7.82.3.31.9.720.12.20.17[8]B54/03Retzli7.30.646.72.3.39.720.12.20.17[8]B54/13Indein9.10.587.61.9.53.6.220.12[16,19]B54/04Ricd7.30.645.75.34.11.0.82.1.12.1.1B57/28McImmine M.00.55.61.8.43.12.1.21.6.2.1 <t< td=""><td>A54g/11</td><td>Unteraar</td><td>22.7</td><td>2.85</td><td>126</td><td>377</td><td>285</td><td>29.7</td><td>1086-2002,2012</td><td>[1,19,21,22]</td></t<>	A54g/11	Unteraar	22.7	2.85	126	377	285	29.7	1086-2002,2012	[1,19,21,22]
A51d/10         Huefi         12.6         1.23         104         305         160         18.4         2018         [7]           B35/01         Oberalsets         1.7.1         1.20         6.8         225         350         74.4         1988,1998,2011         [7,16]           B35/05         Tunutt         1.4.8         1.02         70         265         352         20.8         2012,2017         [8,16]           A55h/13         Alpeti         1.2.9         1.0.1         74         20.6         25.6         2008,2012,2017         [8,13]           A54c/24         Trift         1.4.6         0.80         55         32.4         22.6         22.6         2002,2002,2012,012         [16,19]           B62/05         Zinal         1.3.5         0.78         58         28         266         1.7.5         2007,2010,2016,2017         [8,1,25]           B63/05         Zinal         1.3.5         0.78         58         28         266         1.7.5         2007,2010,2016,2017         [8,1,26]           B54/04         Patriman         1.0.7         6.6         1.22         32.7         4.18         2012,2016         [8,1,62]           B54/05         Gaulia	B43/03	Rhone	14.6	1.46	99	419	181	30.2	2003,2008	[4,19]
B83/01         Ocrbasister         1.4.9         1.2.2         8.2         2.4.7         4.2.5         31.4         198.1998,2011         [7,16]           B57/05         Zmutt         1.4.8         1.0.2         7.0         2.65         32.2         2.0.8         2012,2017         [8,16]           B55/03         Findelen         1.3.9         1.0.1         7.4         2.66         2.54         2.0.8         2012,2017         [8,13]           B52/03         Findelen         1.3.9         1.0.1         7.4         2.66         2.54         2.0.2         2.001,2002,2002,2017         [8,13]           A54/24         Trift         1.4.6         0.78         5.8         2.26         5.33         1.9.7         2.012,2016         [8,16]           B52/27         Oterman         1.3.6         0.78         5.8         2.08         2.66         1.7.5         2.012,2017         [8,16]           B53/04         Raetzi         7.3         0.64         8.7         2.08         5.7         4.7.3         2.014         2.012         [16]           B52/29         Allalin         9.1         0.58         6.4         2.42         3.7         2.012         [16]         1.6.23	A51d/10	Huefi	12.6	1.23	104	305	160	18.4	2018	[8]
B36/01         Oberalesch         17.1         1.20         68         225         350         74.4         2007,2017,2017,81,616           A55b/13         Alpedi         1.20         1.02         91         228         1.46         4.6.5         2012,2017         [8,16]           A55b/13         Mortentsch         1.49         0.00         61         281         225         2008,2012,2017         [8,13]           A54c/24         Trifi         1.46         0.80         55         33         1.97         2007,201,201,2017         [8,16]           B63/05         Zinal         1.35         0.78         58         208         266         1.75         2007,201,201,201,2017         [8,125]           B63/05         Zinal         1.35         0.78         58         208         266         1.75         2007,201,201,201,201,70         [8,125]           B63/05         Turmann         1.07         0.66         61         210         217         1.81         2012         [16]           A51/03         Gauli         0.18         0.57         53         253         405         365         2012         [16]           B52/29         Allain         9.1         0.50 </td <td>B83/03</td> <td>Corbassiere</td> <td>14.9</td> <td>1.22</td> <td>82</td> <td>247</td> <td>425</td> <td>31.4</td> <td>1988,1998,2011</td> <td>[7,16]</td>	B83/03	Corbassiere	14.9	1.22	82	247	425	31.4	1988,1998,2011	[7,16]
B57/05         Zmutt         14.8         1.02         70         265         332         20.8         2012,2017         [8,16]           B56/03         Findelen         13.9         1.01         74         206         254         29.5         2001,2002,2017         [8,13]           A54/24         Tríf         14.6         0.80         55         32.4         226         32.6         2001,2002,2007,2017         [8,16]           B82/27         Oremma         13.5         0.78         58         226         53.3         19.7         2011,2016         [8,16]           B63/05         Zinal         13.5         0.78         58         208         266         17.5         2012,2017         [8]           B54/05         Gauli         1.0         7.3         0.64         87         208         57         47.3         2016,2017         [8]           B54/03         Raetzli         7.3         0.64         87         208         2012         161         161           B54/04         Fee         13.8         0.57         53         23.4         368         4.1         2013         2017         [8]           B54/03         Ried         7	B36/01	Oberaletsch	17.1	1.20	68	225	350	74.4	2009,2011,2017,2019	[8,27,31,32]
A55b/13       Alpedi       12.0       1.0.2       91       228       146       46.5       2012.2019       [8,12,16]         B56/03       Findelen       13.9       1.01       74       206       254       29.5       2008.2012.2017       [8,13,16]         B56/03       Findelen       14.6       0.80       55       324       226       32.6       2002.2008.2012       [16,19]         B82/27       Otemma       12.6       0.78       62       256       533       19.7       2011.2016       [8,11,25]         B60/09       Turman       10.7       0.66       61       210       217       18.1       2012       [16,0]         A54/19       Untgrindelwaid       9.1       0.66       68       197       430       9.1       2019       [16,19]         B52/29       Allain       9.1       0.18       0.57       53       253       36.5       2012       [16,19]         B52/29       Allain       9.1       0.18       0.57       53       253       36.5       2012       [16,19]         B52/29       Alla       0.1       0.55       58       184       391       8.7       2013       [28] </td <td>B57/05</td> <td>Zmutt</td> <td>14.8</td> <td>1.02</td> <td>70</td> <td>265</td> <td>332</td> <td>20.8</td> <td>2012,2017</td> <td>[8,16]</td>	B57/05	Zmutt	14.8	1.02	70	265	332	20.8	2012,2017	[8,16]
B56/03         Findelen         13.9         1.01         74         206         254         29.5         2008.2012,2017         [8,13]           A54e/24         Trift         14.6         0.80         55         324         226         32.6         2002.2008,2012         [16,19]           B52/27         Oremma         12.6         0.78         62         256         533         19.7         2011,2016         [8,16]           B53/05         Zinal         13.5         0.78         58         208         266         17.5         2007,2010,2016,2017         [8,1]           A550/03         Raetzli         7.3         0.64         87         208         57         47.3         2016,2017         [8]           A54/19         Untrranan         0.7         53         253         405         36.5         2012         [16,20]           A54/05         Gauli         0.8         0.7         53         253         405         36.5         2012         [16,20]           A54/04         Ree         1.3.8         0.57         41         161         34.65         2012         [16,1]           B52/29         Alla         2013         2011         [16,2	A55b/13	Alpetli	12.0	1.02	91	228	146	46.5	2012,2019	[8,16]
E22/03         Morteratsch         14.6         0.80         55         225         25.5         2001_2002,2017         [8,13]           A54c/24         Trift         14.6         0.80         55         324         226         32.6         2002_2008,2012         [16,19]           B62/05         Zinal         13.5         0.78         58         208         226         32.6         2002_2008,2012         [16,19]           B63/05         Zinal         13.5         0.78         58         208         2066         17.5         2007_2010,2016,2017         [8]           A54/19         Untgrindelwald         9.1         0.66         68         197         430         9.1         2019         [8]           S52/09         Allalin         0.1         0.88         64         242         32.0         198.2008,2013,2017         [16,19]           B53/04         Fee         13.8         0.57         53         253         405         36.5         2012         [16]           C33/04         Ried         9.6         0.55         58         184         391         8.7         2012         [16]           C34/21         Norttmine         0.10         0.54	B56/03	Findelen	13.9	1.01	74	206	254	29.5	2008,2012,2017	[8,12,16]
A54e/24       Tritt       14.6       0.80       55       324       226       32.6       2002,2008,2012       [16,19]         B63/27       Otemma       12.6       0.78       62       256       533       19.7       2011,2016       [8,16]         B63/05       Zinal       13.5       0.78       58       208       256       17.5       2007,2010,2016,2017       [8,11,25]         B60/09       Turtmann       10.7       0.66       61       210       217       18.1       2016,2017       [8]         A54/19       Untgrindelwald       9.2       0.66       68       197       430       9.1       2016,2017       [8,16,29]         B53/04       Fee       13.8       0.57       41       161       346       10.8       2013,2017       [8,16,28]         B54/28       Ithedu       7.2       0.55       58       184       91       8.7       2013       [29]         B54/28       Ithedu       9.6       0.55       58       184       391       8.7       2013       [21]         B54/28       Ithedu       9.6       0.55       58       184       391       8.7       2013       2017       [8	E22/03	Morteratsch	14.9	0.90	61	281	225	25.5	2001,2002,2017	[8,13]
B82/27         Otemma         12.6         0.78         62         256         533         19.7         2011,2016         [8,16]           B63/05         Zinal         13.5         0.78         58         208         266         17.5         2007,2010,2015,2017         [8,11,25]           B60/09         Turtmann         10.7         0.66         61         210         217         18.1         2012         [16]           S54/09         Matrineldewald         9.2         0.60         68         197         430         9.1         2019         [8]           S52/29         Alalin         0.18         0.57         53         253         405         36.5         2012         [16,19]           B53/04         Fee         13.8         0.57         41         161         346         10.4         2013,2017         [8,16,28]           B54/03         Ried         7.2         0.55         58         184         391         8.1         2013,2017         [8,16,28]           B54/13         Natrine         10.1         0.51         54         155         2012         [16]         133           B57/15         Montinine         10.3         0.49	A54e/24	Trift	14.6	0.80	55	324	226	32.6	2002,2008,2012	[16,19]
B63/05         Zinal         13.5         0.78         58         208         266         17.5         2007,2010,2017         [81,11,25]           B66/09         Turtmann         10.7         0.66         61         210         18.1         2012         [16]           A55/03         Raetzi         7.3         0.64         87         208         57         47.3         2016,2017         [8]           A54/05         Gauli         0.8         0.57         53         253         405         36.5         2012         [16,19]           B53/04         Fee         13.8         0.57         41         161         346         10.8         2013,2017         [8],628]           B54/03         Ried         7.2         0.55         58         184         391         8.7         2013         [29]           B55/28         u. Theodul         9.6         0.55         58         184         391         8.7         2012         [16]           B72/15         Montmine         0.1         0.55         58         184         391         8.7         2012,2019         [8],16]           B72/14         Kerne         6.0         0.52         88	B82/27	Otemma	12.6	0.78	62	256	533	19.7	2011,2016	[8,16]
B60/09         Turtmann         10.7         0.66         61         210         217         18.1         2012         [16]           A55f/03         Ratzli         7.3         0.64         87         208         57         47.3         2016,2017         [8]           A54/01         Ungrindelwald         9.2         0.60         68         197         430         9.1         2016,2017         [8]           B52/29         Allain         9.1         0.88         64         242         327         32.1         1982,2008,2013,2017         [8],628]           B54/03         Ried         7.2         0.55         76         195         308         4.1         2013         [26]           B54/03         Richoull         9.6         0.55         58         184         391         8.7         2012         [16]           B54/03         Nontmine         10.1         0.54         54         155         416         5.4         2012         [16]           C83/12         Forno         6.0         0.52         88         300         164         9.9         2012         [16]           S44/104         Lange         0.50         56	B63/05	Zinal	13.5	0.78	58	208	266	17.5	2007,2010,2016,2017	[8,11,25]
Abstr.03         Raetzin         7.3         0.64         87         208         57         47.3         2016_017         [8]           Abstr.03         Intrgrindelwald         9.2         0.00         68         197         430         9.1         2019         [8]           B52/29         Allalin         9.1         0.58         64         242         327         32.1         1982,2008,2013,2017         [6,16,9]           B53/26         Cauli         10.8         0.57         53         253         405         36.5         2012         [6,16,9]           B56/28         U. Theodul         9.6         0.55         58         184         391         8.7         2013         [29]           B72/15         Montmine         10.1         0.54         58         184         391         8.7         2017         [8]           B72/14         Ferocle         9.1         0.50         56         148         325         5.5         2012         [8,16]           B72/14         Larg         Rorena         6.7         0.46         68         203         175         3.8+6.7         2013,2020         [8,9,16]           B82/16         Salcina	B60/09	Turtmann	10.7	0.66	61	210	217	18.1	2012	[16]
AS4/1/9         Unigrindetwald         9.2         0.60         68         197         430         9.1         2019         [8]           B52/29         Allalin         9.1         0.58         64         242         32.1         1982,2008,2013,2017         [16,19]           B53/04         Fee         13.8         0.57         53         253         405         36.5         2012         [16,19]           B54/03         Ried         7.2         0.55         76         195         308         4.1         2013         [26]           B54/28         u. Theodul         9.6         0.55         58         184         391         8.7         2012         [16]           C33/12         Forno         6.0         0.52         88         300         164         9.9         2012         [8]           B31/04         Lang         8.0         0.49         59         204         185         17.5         2.84.6.7         2013,2020         [8,9,16]           B31/04         Lang         6.7         0.46         68         203         175         2.84.6.7         2013,2020         [8,9,16]           B31/04         Galeina         6.7         0.	A55t/03	Raetzli	7.3	0.64	87	208	57	47.3	2016,2017	[8]
B52/29       Allain       9.1       0.58       64       242       327       32.1       1982,2008,2013,2017       [16,19]         B53/04       Fee       13.8       0.57       41       161       346       10.8       2012       [16,19]         B54/03       Ried       7.2       0.55       76       195       308       4.1       2013       [29]         B57/25       Montmine       10.1       0.54       54       155       416       5.4       2012       [16]         B72/15       Montmine       0.0       55       88       300       164       9.9       2017       [8]         B72/14       Fernede       9.1       0.50       56       148       325       5.5       2012       [16]         B72/14       o. Ischmeer E       7.3       0.49       59       204       188       175       2.24.7.6       2012       2012       [8]         B31/04       o. Ischmeer E       7.3       0.48       68       273       311       4.1       2019       [8]         B42/14       Giero       5.1       0.38       75       224       162       10.5       103,2020       [8,9,16]     <	A54I/19	Untgrindelwald	9.2	0.60	68	197	430	9.1	2019	[8]
ASA(v)D         Gaun         10.8         0.57         53         253         405         36.5         2012         [16,19]           B53/04         Fee         13.8         0.57         41         161         346         10.8         2013,2017         [8,16,28]           B54/03         Ried         7.2         0.55         76         195         308         4.1         2013         [29]           B56/28         u. Theodul         9.6         0.55         58         184         391         8.7         2013         [29]           B56/28         u. Theodul         9.6         0.55         56         148         325         5.5         2012         [16]           C83/12         Forpece         9.1         0.50         56         148         325         5.5         2012,2019         [8,16]           B45/16         Jakener E         7.3         0.48         68         273         313         4.1         2013,2020         [8,9,16]           B82/14         Gitro         5.1         0.38         53         212         237         12.6         2011,2018         [7,8,16]           B82/19         Breney         7.1         0.38	B52/29	Allalin	9.1	0.58	64	242	327	32.1	1982,2008,2013,2017	[16,20]
bS3/04       ree       13.8       0.57       41       161       346       10.8       2013,2017       [8,6,28]         B56/28       u. Theodul       9.6       0.55       58       184       391       8.7       2013       [29]         B72/15       Montmine       10.1       0.54       54       155       416       5.4       2012       [16]         C83/12       Forno       6.0       0.52       88       300       164       9.9       2017       [8]         B72/15       Montmine       0.10       0.55       56       148       325       5.5       2012       [16]         B31/04       Lang       8.0       0.49       59       204       185       17.9       2012,2019       [8,9,16]         B85/16       Saleina       6.7       0.46       68       203       175       3.8+6.7       2013,2020       [8,9,16]         B82/14       Gietro       5.1       0.38       75       224       162       101.5       1997,2011,2018       [7,8,16]         B82/14       Gietro       5.1       0.34       63       220       125       8.4       2019       [8]         A54/04 <td>A541/05</td> <td>Gauli</td> <td>10.8</td> <td>0.57</td> <td>53</td> <td>253</td> <td>405</td> <td>36.5</td> <td>2012</td> <td>[16,19]</td>	A541/05	Gauli	10.8	0.57	53	253	405	36.5	2012	[16,19]
DSH/03         Red         7.2         0.53         76         195         308         4.1         2013         [28]           B56/28         u. Theodul         9.6         0.55         58         184         391         8.7         2013         [29]           B72/15         Montmine         10.1         0.54         54         155         416         5.4         2012         [16]           C83/12         Forno         6.0         0.52         88         300         164         9.9         2017         [8]           B72/11         Ferpecle         9.1         0.50         56         148         325         5.5         2012         [16]           B31/04         Lang         8.0         0.49         59         204         185         17.9         2012,2019         [8,9,16]           B85/16         Saleina         6.7         0.46         68         203         175         3.8+6.7         2013,2020         [8,9,16]           B82/14         Gietro         5.1         0.38         53         212         237         12.6         2011,2016         [8,16]           A54/04         Obgrindelwald         8.3         0.34	B53/04	Fee	13.8	0.57	41	161	346	10.8	2013,2017	[8,16,28]
DSb/28         0.11802011         9.6         0.53         58         184         391         8.7         2013         [29]           B72/15         Montmine         10.1         0.54         54         155         416         5.4         2012         [16]           C83/12         Forno         6.0         0.52         88         300         164         9.9         2017         [8]           B72/15         Kerpecle         9.1         0.50         56         148         325         5.5         2012         [16]           B31/04         Lang         8.0         0.49         59         204         185         17.9         2012,2019         [8],16]           A54/31         o. Ischmeer E         7.3         0.48         68         273         331         4.1         2019         [8],16]           B82/14         Gietro         5.1         0.38         75         224         162         10.5         197,2011,2018         [7,8,16]           B82/19         Breney         7.1         0.38         53         212         237         12.6         201,2016         [8,19]           B45/102         Rosenlaui         5.4         0.34	B54/03	Kied	/.2	0.55	/6	195	308	4.1	2013	[28]
D7/2/15       Montimine       10.1       0.54       54       155       416       5.4       2012       [16]         C83/12       Forno       6.0       0.52       88       300       164       9.9       2017       [8]         B72/11       Ferpecle       9.1       0.50       56       148       325       5.5       2012       [16]         B31/04       Lang       8.0       0.49       59       204       185       17.9       2012,2019       [8],16]         A54/31       o. Ischmeer E       7.3       0.48       68       273       331       4.1       2019       [8]         B85/16       Saleina       6.7       0.46       68       203       175       2.24.7.6       2013,2020       [8,9,16]         B82/14       Gietro       5.1       0.38       75       224       162       10.5       1997,2011,2018       [7,8,16]         B82/14       Breney       7.1       0.38       53       212       237       12.6       2011,2016       [8,16]         A54/02       Rosenlaui       5.4       0.34       44       180       256       6.2       2010,2019       [8,16]	B56/28	u. Theodul	9.0	0.55	58	184	391	8./	2013	[29]
Cosy 12Formo6.00.32883001649.92017[6]B72/11Ferpecle9.10.50561483255.52012[16]B31/04Lang8.00.495920418517.92012,2019[8,16]A54/310. Ischmeer E7.30.48682733314.12019[8]B85/16Saleina6.70.46682031753.8+6.72013,2020[8,9,16]B90/02Trient5.80.41711881752.2+7.62013,2020[8,9,16]B82/19Breney7.10.387522416210.51997,2011,2018[7,8,16]B82/19Breney7.10.387522416210.51997,2011,2018[8,16]A54/02Rosenlaui5.40.34632201258.42019[8]A541/04Obgrindelwald8.30.34441802566.22010,2019[8,16]A541/04Obgrindelwald6.20.27431543199.12011[16]A541/04Graiden4.70.30682161189.51992,2018[8,16]B82/36Montdurand6.20.27431543199.12011[16]A54/04gries4.60.26552091926.81999[5]B64/02<	B/2/15	Montmine	10.1	0.54	54	155	416	5.4	2012	[10]
	C83/12	FOIIIO	0.0	0.52	88 56	300	104	9.9	2017	[ð] [16]
b31/04       Lang       6.0       0.49       39       204       163       17.9       2012,2019       [8]         A541/31       o. Ischmeer E       7.3       0.48       68       203       175       3.84-6.7       2013,2020       [8,9,16]         B85/16       Saleina       6.7       0.46       68       203       175       3.84-6.7       2013,2020       [8,9,16]         B82/14       Gietro       5.1       0.38       75       224       162       10.5       1997,2011,2018       [7,8,16]         B82/19       Breney       7.1       0.38       53       212       237       12.6       2011,2016       [8,16]         A54/04       Obgrindelwald       8.3       0.34       44       180       256       6.2       2010,2019       [8,19]         B32/14       Arolla       5.1       0.30       60       193       229       20.2       2011,2016       [8,16]         A54/04       Distrierva       5.6       0.27       49       157       218       9.7       2017       [8]         B42/36       Montdurand       6.2       0.27       43       154       319       9.1       2011       [16]	D/2/11	Leng	9.1	0.50	50	140	323	5.5 17.0	2012	[10]
AS47/31       0.18111100112       7.3       0.43       608       273       351       4.1       2019       [6]         B85/16       Saleina       6.7       0.46       68       203       175       3.84-6.7       2013,2020       [8,9,16]         B82/14       Gietro       5.1       0.38       75       224       162       10.5       1997,2011,2018       [7,8,16]         B82/19       Breney       7.1       0.38       53       212       237       12.6       2011,2016       [8,16]         A54/02       Rosenlaui       5.4       0.34       63       220       125       8.4       2019       [8]         B45/10       Chriden       4.7       0.30       60       193       229       20.2       2011,2016       [8,16]         A50/19       Clariden       4.7       0.30       68       216       118       9.5       1992,2018       [8,19]         E23/06       Tschierva       5.6       0.27       49       157       218       9.7       2017       [8]         B45/04       gries       4.6       0.26       51       178       199       17.2       2012       [16]	D31/04	Lally	0.0 7.2	0.49	59 60	204	105	17.9	2012,2019	[0,10]
bbs/10       Jatenia       0.7       0.40       06       203       173       5.76.7       2013,2020       [8,9,16]         B90/02       Trient       5.8       0.41       71       188       175       2.24.7.6       2013,2020       [8,9,16]         B82/19       Breney       5.1       0.38       75       224       162       10.5       1997,2011,2018       [7,8,16]         B82/19       Breney       7.1       0.38       53       212       237       12.6       2011,2016       [8,16]         A54/04       Obgrindelwald       8.3       0.34       44       180       256       6.2       2010,2019       [8,19]         B73/14       Arolla       5.1       0.30       60       193       229       20.2       2011,2016       [8,16]         A50/19       Clariden       4.7       0.30       68       216       118       9.5       1992,2013       [8,16]         B45/04       gries       4.6       0.26       55       209       192       6.8       1999       [5]         B46/02       Moiry       5.0       0.26       51       178       199       17.2       2012       [16]	A341/31 D05/16	0. Iscilleer E	7.3 6.7	0.46	68	2/3	175	4.1	2019	[0] [9 0 16]
DS/002       Iten       5.3       0.41       71       105       173       2.2477.05       2017,2012       [5,710]         B82/14       Gietro       5.1       0.38       75       224       162       10.5       197,2011,2018       [7,816]         B82/14       Gietro       5.4       0.34       63       220       125       8.4       2019       [8]         A541/04       Obgrindelwald       8.3       0.34       44       180       256       6.2       2010,2019       [8,19]         B73/14       Arolla       5.1       0.30       60       193       229       20.2       2011,2016       [8,16]         A50/19       Clariden       4.7       0.30       68       216       118       9.5       1992,2018       [8,19]         E23/06       Tschierva       5.6       0.27       49       157       218       9.7       2011       [16]         B45/04       gries       4.6       0.26       55       209       192       6.8       1999       [5]         B64/02       Moiry       5.0       0.26       51       178       190       9.7       2012       [16]         B45/21	B00/02	Trient	5.8	0.40	08 71	203	175	$3.0\pm0.7$	2013,2020	[8,9,10]
bb2/14       breney       7.1       0.36       7.3       2.24       102       10.3       1997,2011,2016       [7,6,16]         B82/19       Breney       7.1       0.38       53       212       237       12.6       2011,2016       [8]         A54l/02       Rosenlaui       5.4       0.34       63       220       125       8.4       2019       [8]         A54l/04       Obgrindelwald       8.3       0.34       44       180       256       6.2       2010,2019       [8,19]         B73/14       Arolla       5.1       0.30       68       216       118       9.5       1992,2018       [8,19]         E23/06       Tschierva       5.6       0.27       49       157       218       9.7       2017       [8]         B82/36       Montdurand       6.2       0.27       43       154       319       9.1       2011       [16]         A54/04       gries       4.6       0.26       55       209       192       6.8       1999       [5]         B64/02       Moiry       5.0       0.26       51       178       199       17.2       2012       [16]         A54m/21 <td>B90/02 B92/14</td> <td>Cietro</td> <td>5.0</td> <td>0.38</td> <td>75</td> <td>224</td> <td>162</td> <td>2.2+7.0</td> <td>1007 2011 2018</td> <td>[0,9,10]</td>	B90/02 B92/14	Cietro	5.0	0.38	75	224	162	2.2+7.0	1007 2011 2018	[0,9,10]
A54/02       Rosenlaui       5.4       0.34       63       220       125       8.4       2019       [8]         A54/04       Obgrindelwald       8.3       0.34       44       180       256       6.2       2010,2019       [8,19]         B73/14       Arolla       5.1       0.30       60       193       229       20.2       2011,2016       [8,19]         A50i/19       Clariden       4.7       0.30       68       216       118       9.5       1992,2018       [8,19]         B82/36       Mondurand       6.2       0.27       43       154       319       9.1       2011       [16]         B45/04       gries       4.6       0.26       51       178       199       17.2       2012       [16]         B45/04       gries       4.6       0.26       51       178       190       9.7       2012       [16]         A54m/21       Tschingel       5.1       0.23       56       137       190       9.7       2012       [16]         B52/24       Schwarzberg       5.1       0.23       44       124       162       12.0       2008       [16]         B52/24	B82/14	Breney	5.1 7 1	0.38	73 53	224	237	12.6	2011 2016	[7,0,10]
A54/04       Obgrindelwald       8.3       0.34       44       180       256       6.2       2010,2019       [8,19]         B73/14       Arolla       5.1       0.30       60       193       229       20.2       2011,2016       [8,16]         A50/19       Clariden       4.7       0.30       68       216       118       9.5       1992,2018       [8,19]         E23/06       Tschierva       5.6       0.27       49       157       218       9.7       2017       [8]         B82/36       Montdurand       6.2       0.27       43       154       319       9.1       2011       [16]         B45/04       gries       4.6       0.26       55       209       192       6.8       1999       [5]         B64/02       Moiry       5.0       0.26       51       178       190       9.7       2012       [16]         A54m/21       Tschingel       5.1       0.23       50       139       94       35.1       2012,2019       [8]         B30/06       Tellin       5.1       0.23       68       214       26       12.0       2008       [16]         A54m/12       <	Δ54i/02	Bosenlaui	7.1 5.4	0.30	63	212	125	12.0 8 4	2011,2010	[0,10]
B73/14Arolla5.10.306011101022920.22011,2016[8,16]A50i/19Clariden4.70.30682161189.51992,2018[8,16]E23/06Tschierva5.60.27491572189.72017[8]B82/36Montdurand6.20.27431543199.12011[16]B45/04gries4.60.26552091926.81999[5]B64/02Moiry5.00.265117819917.22012[16]A54m/21Tschingel5.10.23561371909.72019[8]B62/10Moming5.40.24451892828.12017[8]B30/06Tellin5.10.23501399435.12012,2019[8,16]B52/24Schwarzberg5.10.23682142763.12019,2017[8]E23/11Roseg6.60.2235971689.72017[8]B36/21Mittelaletsch6.60.22321432828.02009,2017[8,27]B74/08Cheillon3.50.216019410410.72016,2018[8]B22/01Tsanfleuron2.40.21841758714.72010,2012[6,18]B73/16Tsidji	A541/04	Obgrindelwald	83	0.34	44	180	256	6.2	2010 2019	[8 19]
A50i/19       Clariden       4.7       0.30       68       216       118       9.5       1992,2018       [8,19]         E23/06       Tschierva       5.6       0.27       49       157       218       9.7       2017       [8]         B82/36       Montdurand       6.2       0.27       43       154       319       9.1       2011       [16]         B45/04       gries       4.6       0.26       55       209       192       6.8       1999       [5]         B64/02       Moiry       5.0       0.26       51       178       199       17.2       2012       [16]         A54m/21       Tschingel       5.1       0.25       56       137       190       9.7       2012       [8]         B30/06       Tellin       5.1       0.23       50       139       94       35.1       2012,2019       [8]         B32/24       Schwarzberg       5.1       0.23       44       124       162       12.0       2008       [16]         A54m/12       Rotal       3.6       0.22       35       97       168       9.7       2017       [8]         B36/21       Mitrelaletsch </td <td>B73/14</td> <td>Arolla</td> <td>5.1</td> <td>0.30</td> <td>60</td> <td>100</td> <td>220</td> <td>20.2</td> <td>2010,2017</td> <td>[8,16]</td>	B73/14	Arolla	5.1	0.30	60	100	220	20.2	2010,2017	[8,16]
BashorBashorBashorBashorBashorBashorBashorBashorB23/06Tschierva5.60.27431572189.72017[8]B82/36Montdurand6.20.27431543199.12011[16]B45/04gries4.60.26552091926.81999[5]B64/02Moiry5.00.265117819917.22012[16]A54m/21Tschingel5.10.25561371909.72019[8]B62/10Moming5.40.24451892828.12017.0[8]B30/06Tellin5.10.23501399435.12012,2019[8]B52/24Schwarzberg5.10.234412416212.02008[16]A54m/12Rottal3.60.23682142763.12019[8]B36/21Mittelaletsch6.60.2235971689.72016,2018[8]B22/01Tsanfleuron2.40.21841758714.72010,2017[8,16]B22/01Tsanfleuron2.40.21841758714.72010,2012[6,18]B73/16Tsidjiore2.80.206918012819.82011,2016,2018[8]B55/04Hohberg3.00.19 <td< td=""><td>A50i/19</td><td>Clariden</td><td>47</td><td>0.30</td><td>68</td><td>216</td><td>118</td><td>95</td><td>1992 2018</td><td>[8,10]</td></td<>	A50i/19	Clariden	47	0.30	68	216	118	95	1992 2018	[8,10]
B82/36Montdurand6.20.2743154157157157151151151B45/04gries4.60.26552091926.81999[5]B64/02Moiry5.00.265117819917.22012[16]A54m/21Tschingel5.10.25561371909.72019[8]B62/10Moming5.40.24451892828.12017[8]B30/06Tellin5.10.23501399435.12012,2019[8,16]B52/24Schwarzberg5.10.23682142763.12019[8]E23/11Roseg6.60.2235971689.72017[8]B36/21Mittelaletsch6.60.22321432828.02009,2017[8,27]B36/21Mittelaletsch6.60.22321432828.02009,2017[8,27]B74/08Cheillon3.50.216019410410.72016,2018[8]B22/01Tsanfleuron2.40.21841758714.72010,2012[6,18]B73/16Tsidjiore2.80.206918012819.82011,2016,2018[8],16]B55/04Hohberg3.00.19651641009.42017[8]B55/18 <td< td=""><td>E23/06</td><td>Tschierva</td><td>5.6</td><td>0.27</td><td>49</td><td>157</td><td>218</td><td>9.7</td><td>2017</td><td>[8]</td></td<>	E23/06	Tschierva	5.6	0.27	49	157	218	9.7	2017	[8]
B45/06minimizebit <td>B82/36</td> <td>Montdurand</td> <td>6.2</td> <td>0.27</td> <td>43</td> <td>154</td> <td>319</td> <td>9.1</td> <td>2017</td> <td>[16]</td>	B82/36	Montdurand	6.2	0.27	43	154	319	9.1	2017	[16]
B64/02Moiry5.00.265117819917.22012[16]A54m/21Tschingel5.10.25561371909.72019[8]B62/10Moming5.40.24451892828.12017[8]B30/06Tellin5.10.23501399435.12012,2019[8,16]B52/24Schwarzberg5.10.234412416212.02008[16]A54m/12Rottal3.60.23682142763.12019[8]E23/11Roseg6.60.2235971689.72017[8]B36/21Mittelaletsch6.60.22321432828.02009,2017[8,27]B74/08Cheillon3.50.216019410410.72016,2018[8]B22/01Tsanfleuron2.40.21841758714.72010,2012[6,18]B73/16Tsidjiore2.80.206918012819.82011,2016,2018[8,16]B55/04Hohberg3.00.19651641009.42017[8]B58/02Hohlicht4.50.194415318712.32012,2017[8,9,16]B58/08Bis4.20.194415318712.32012,2017[8,16]B55/18Mellich3.1	B45/04	gries	4.6	0.26	55	209	192	6.8	1999	[5]
A54m/21Tschingel5.10.25561371909.72019[8]B62/10Moming5.40.24451892828.12017[8]B30/06Tellin5.10.23501399435.12012,2019[8,16]B52/24Schwarzberg5.10.234412416212.02008[16]A54m/12Rottal3.60.23682142763.12019[8]E23/11Roseg6.60.2235971689.72017[8]B36/21Mittelaletsch6.60.22321432828.02009,2017[8,27]B74/08Cheillon3.50.216019410410.72016,2018[8]B22/01Tsanfleuron2.40.21841758714.72010,2012[6,18]B73/16Tsidjiore2.80.206918012819.82011,2016,2018[8,16]B55/04Hohberg3.00.19651641009.42017[8]A54e/12Stein5.60.193410319810.4+5.72013,2020[8,9,16]B55/18Mellich3.10.17561131399.32017[8]B73/12Arollahaut3.60.16461372057.21991,2016[8,19]	B64/02	Moirv	5.0	0.26	51	178	199	17.2	2012	[16]
B62/10Moning5.40.24451892828.12017[8]B30/06Tellin5.10.23501399435.12012,2019[8,16]B52/24Schwarzberg5.10.234412416212.02008[16]A54m/12Rottal3.60.23682142763.12019[8]E23/11Roseg6.60.2235971689.72017[8]B36/21Mittelaletsch6.60.22321432828.02009,2017[8,27]B74/08Cheillon3.50.216019410410.72016,2018[8]B22/01Tsanfleuron2.40.21841758714.72010,2012[6,18]B73/16Tsidjiore2.80.206918012819.82011,2016,2018[8,16]B55/04Hohberg3.00.19651641009.42017[8]B58/02Hohlicht4.50.193410319810.4+5.72013,2020[8,9,16]B58/08Bis4.20.194415318712.32012,2017[8,16]B55/18Mellich3.10.17561131399.32017[8]B73/12Arollahaut3.60.16461372057.21991,2016[8,19]	A54m/21	Tschingel	5.1	0.25	56	137	190	9.7	2019	[8]
B30/06Tellin5.10.23501399435.12012,2019[8,16]B52/24Schwarzberg5.10.234412416212.02008[16]A54m/12Rottal3.60.23682142763.12019[8]E23/11Roseg6.60.2235971689.72017[8]B36/21Mittelaletsch6.60.22321432828.02009,2017[8,27]B74/08Cheillon3.50.216019410410.72016,2018[8]B22/01Tsanfleuron2.40.21841758714.72010,2012[6,18]B73/16Tsidjiore2.80.206918012819.82011,2016,2018[8,16]B55/04Hohberg3.00.19651641009.42017[8]B58/02Hohlicht4.50.193410319810.4+5.72013,2020[8,9,16]B58/08Bis4.20.194415318712.32012,2017[8,16]B55/18Mellich3.10.17561131399.32017[8]B73/12Arollahaut3.60.16461372057.21991,2016[8,19]	B62/10	Moming	5.4	0.24	45	189	282	8.1	2017	[8]
B52/24Schwarzberg5.10.234412416212.02008[16]A54m/12Rottal3.60.23682142763.12019[8]E23/11Roseg6.60.2235971689.72017[8]B36/21Mittelaletsch6.60.22321432828.02009,2017[8,27]B74/08Cheillon3.50.216019410410.72016,2018[8]B22/01Tsanfleuron2.40.21841758714.72010,2012[6,18]B73/16Tsidjiore2.80.206918012819.82011,2016,2018[8]B55/04Hohberg3.00.19651641009.42017[8]B58/02Hohlicht4.50.194415318712.32012,2017[8,9,16]B58/08Bis4.20.194415318712.32012,2017[8,16]B55/18Mellich3.10.17561131399.32017[8]B73/12Arollahaut3.60.16461372057.21991,2016[8,19]	B30/06	Tellin	5.1	0.23	50	139	94	35.1	2012,2019	[8,16]
A54m/12Rottal3.60.23682142763.12019[8]E23/11Roseg6.60.2235971689.72017[8]B36/21Mittelaletsch6.60.22321432828.02009,2017[8,27]B74/08Cheillon3.50.216019410410.72016,2018[8]B22/01Tsanfleuron2.40.21841758714.72010,2012[6,18]B73/16Tsidjiore2.80.206918012819.82011,2016,2018[8]B55/04Hohberg3.00.19651641009.42017[8]B58/02Hohlicht4.50.19421941349.02017[8]A54e/12Stein5.60.193410319810.4+5.72013,2020[8,9,16]B58/08Bis4.20.194415318712.32012,2017[8,16]B55/18Mellich3.10.17561131399.32017[8]B73/12Arollahaut3.60.16461372057.21991,2016[8,19]	B52/24	Schwarzberg	5.1	0.23	44	124	162	12.0	2008	[16]
E23/11Roseg6.60.2235971689.72017[8]B36/21Mittelaletsch6.60.22321432828.02009,2017[8,27]B74/08Cheillon3.50.216019410410.72016,2018[8]B22/01Tsanfleuron2.40.21841758714.72010,2012[6,18]B73/16Tsidjiore2.80.206918012819.82011,2016,2018[8,16]B55/04Hohberg3.00.19651641009.42017[8]B58/02Hohlicht4.50.19421941349.02017[8]A54e/12Stein5.60.193410319810.4+5.72013,2020[8,9,16]B58/08Bis4.20.194415318712.32012,2017[8,16]B55/18Mellich3.10.17561131399.32017[8]B73/12Arollahaut3.60.16461372057.21991,2016[8,19]	A54m/12	Rottal	3.6	0.23	68	214	276	3.1	2019	[8]
B36/21Mittelaletsch6.60.22321432828.02009,2017[8,27]B74/08Cheillon3.50.216019410410.72016,2018[8]B22/01Tsanfleuron2.40.21841758714.72010,2012[6,18]B73/16Tsidjiore2.80.206918012819.82011,2016,2018[8,16]B55/04Hohberg3.00.19651641009.42017[8]B58/02Hohlicht4.50.19421941349.02017[8]A54e/12Stein5.60.193410319810.4+5.72013,2020[8,9,16]B58/08Bis4.20.194415318712.32012,2017[8]B55/18Mellich3.10.17561131399.32017[8]B73/12Arollahaut3.60.16461372057.21991,2016[8,19]	E23/11	Roseg	6.6	0.22	35	97	168	9.7	2017	[8]
B74/08Cheillon3.50.216019410410.72016,2018[8]B22/01Tsanfleuron2.40.21841758714.72010,2012[6,18]B73/16Tsidjiore2.80.206918012819.82011,2016,2018[8,16]B55/04Hohberg3.00.19651641009.42017[8]B58/02Hohlicht4.50.19421941349.02017[8]A54e/12Stein5.60.193410319810.4+5.72013,2020[8,9,16]B58/08Bis4.20.194415318712.32012,2017[8]B55/18Mellich3.10.17561131399.32017[8]B73/12Arollahaut3.60.16461372057.21991,2016[8,19]	B36/21	Mittelaletsch	6.6	0.22	32	143	282	8.0	2009,2017	[8,27]
B22/01Tsanfleuron2.40.21841758714.72010,2012[6,18]B73/16Tsidjiore2.80.206918012819.82011,2016,2018[8,16]B55/04Hohberg3.00.19651641009.42017[8]B58/02Hohlicht4.50.19421941349.02017[8]A54e/12Stein5.60.193410319810.4+5.72013,2020[8,9,16]B58/08Bis4.20.194415318712.32012,2017[8,16]B55/18Mellich3.10.17561131399.32017[8]B73/12Arollahaut3.60.16461372057.21991,2016[8,19]	B74/08	Cheillon	3.5	0.21	60	194	104	10.7	2016,2018	[8]
B73/16Tsidjiore2.80.206918012819.82011,2016,2018[8,16]B55/04Hohberg3.00.19651641009.42017[8]B58/02Hohlicht4.50.19421941349.02017[8]A54e/12Stein5.60.193410319810.4+5.72013,2020[8,9,16]B58/08Bis4.20.194415318712.32012,2017[8,16]B55/18Mellich3.10.17561131399.32017[8]B73/12Arollahaut3.60.16461372057.21991,2016[8,19]	B22/01	Tsanfleuron	2.4	0.21	84	175	87	14.7	2010,2012	[6,18]
B55/04Hohberg3.00.19651641009.42017[8]B58/02Hohlicht4.50.19421941349.02017[8]A54e/12Stein5.60.193410319810.4+5.72013,2020[8,9,16]B58/08Bis4.20.194415318712.32012,2017[8,16]B55/18Mellich3.10.17561131399.32017[8]B73/12Arollahaut3.60.16461372057.21991,2016[8,19]	B73/16	Tsidjiore	2.8	0.20	69	180	128	19.8	2011,2016,2018	[8,16]
B58/02Hohlicht4.50.19421941349.02017[8]A54e/12Stein5.60.193410319810.4+5.72013,2020[8,9,16]B58/08Bis4.20.194415318712.32012,2017[8,16]B55/18Mellich3.10.17561131399.32017[8]B73/12Arollahaut3.60.16461372057.21991,2016[8,19]	B55/04	Hohberg	3.0	0.19	65	164	100	9.4	2017	[8]
A54e/12Stein5.60.193410319810.4+5.72013,2020[8,9,16]B58/08Bis4.20.194415318712.32012,2017[8,16]B55/18Mellich3.10.17561131399.32017[8]B73/12Arollahaut3.60.16461372057.21991,2016[8,19]	B58/02	Hohlicht	4.5	0.19	42	194	134	9.0	2017	[8]
B58/08         Bis         4.2         0.19         44         153         187         12.3         2012,2017         [8,16]           B55/18         Mellich         3.1         0.17         56         113         139         9.3         2017         [8]           B73/12         Arollahaut         3.6         0.16         46         137         205         7.2         1991,2016         [8,19]	A54e/12	Stein	5.6	0.19	34	103	198	10.4 + 5.7	2013,2020	[8,9,16]
B55/18         Mellich         3.1         0.17         56         113         139         9.3         2017         [8]           B73/12         Arollahaut         3.6         0.16         46         137         205         7.2         1991,2016         [8,19]	B58/08	Bis	4.2	0.19	44	153	187	12.3	2012,2017	[8,16]
B73/12 Arollahaut 3.6 0.16 46 137 205 7.2 1991,2016 [8,19]	B55/18	Mellich	3.1	0.17	56	113	139	9.3	2017	[8]
	B73/12	Arollahaut	3.6	0.16	46	137	205	7.2	1991,2016	[8,19]

Continued on Next Page...

Table S1: List of	glaciers	with GPR	data	(continued)
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SGI-id	Glacier Name	Α	$V_{2016}$	Interpolat	ion	$d_{\rm mean-gp}$	<sub>r</sub> p. length	GPR survey	GPR survey
		(km <sup>2</sup> )	(km <sup>3</sup> 5)	$h_{\rm mean}(m)$	$h_{\max}(m)$	(m)	(km)	year(s)	references <sup>1</sup>
B57/16	Trift (Zermatt)	2.1	0.14	68	212	125	3.8	2017	[8]
C93/04 A10g/05	Palue Silvretta	5.4 2.7	0.14	29 55	84 120	155 142	10.6 4 5	2017 2007	[8] [4]
A54g/03	Oberaar	4.0	0.14	40	120	113	22.8	2007	[16,19]
C84/16	Albigna	2.4	0.14	58	152	179	4.9	2017	[8]
A51d/15	Brunni	2.2	0.12	53	152	127	4.4	2018	[8]
A54m/19 B52/22	Breithorn	2.5	0.12	52 51	189 127	159 254	3.8	2019	[8] [16]
B57/10	Hohwaeng	2.2	0.11	49	119	106	4.2	2013	[8]
A50i/12	Biferten	2.6	0.11	47	110	96	7.0	2018	[8]
B56/31	Furgg	3.8	0.10	28	92	382	6.2	2013	[29]
B56/14	Adler	2.1	0.096	46 71	133	183	4.7	2017	[8] [8 0 16]
B34/02	Baltschieder	3.6	0.093	23	81	213	7.6	2013,2020	[16]
B57/14	Gabelhorn	1.8	0.083	46	198	198	2.7	2017	[8]
C01/04	Weissmies	1.9	0.082	41	117	92	5.7	2018	[8]
B55/07	Festi	1.8	0.080	44	122	165	4.1	2017	[8]
A55C/13	Laemmern Hengsteren NF	2.3	0.079	34 47	86 117	137	6.4 2.1	2017	[8] [8]
E50/07	Tiatscha	1.7	0.077	43	92	885	4.5	2017	[4]
A51c/02	Griess	2.1	0.076	41	104	120	5.6	2018	[8]
B56/30	Theodul	2.4	0.075	32	105	151	6.3	2013	[25]
B34/03	i. Baltschieder	1.7	0.075	43	109	259	2.0	2013	[29]
B41/0/ F26/01	Minstiger	2.2	0.074	32 40	96 112	147	4.3	2013	[16] [8]
B55/36	Mellich	1.5	0.074	47	125	130	5.9	2017	[8]
C05/02	Alpjer	2.1	0.071	32	84	155	4.2	2018	[8]
B53/08	Bider	1.3	0.068	54	112	465	0.2	2013	[28]
A54e/06	Wenden	1.7	0.068	41	146	186	2.8	2013	[16]
A54m/06 B55/08	Glesen Kin	1./	0.063	43 53	120	254 112	1.2	2019 2017	[8] [8]
A14g/02	Medel z	1.8	0.062	35	74	154	2.5	2017	[8]
B85/07	Neuve	1.9	0.062	32	117	205	1.0 + 1.9	2013,2020	[8,9,16]
E25/04	Tremoggia	1.8	0.061	35	85	177	4.1	2017	[8]
B56/10	Monte Rosa	1.3	0.060	46	97	468	17.4	2008	[16]
A301/00 B47/04	Kaltwasser	2.0	0.060	37 37	01 94	142	3.2	2018	[0] [8]
A54m/05	Guggi	1.6	0.059	43	97	138	2.4	2019	[8]
A50k/04	Glaernisch	1.4	0.058	46	132	156	3.3	2018	[8]
A14g/16	Medel E	1.2	0.056	49	118	125	1.9	2018	[8]
B62/0/ A54m/03	Weisshorn	1.7	0.054	32 36	87 03	134 176	3.9	2017	[8] [8]
B73/15	Piece	1.3	0.052	30 40	133	178	3.7	2019	[8]
B55/12	Weingarten	1.3	0.051	39	103	91	4.6	2017	[8]
A13n/06	Paradies	1.9	0.049	29	107	165	3.0	2018	[8]
B62/08	Weisshorn S	1.3	0.048	38	121	246	1.1	2017	[8]
B/3/26 C02/04	Vouasson Z Rossboden	1.5 1.2	0.048	32 30	94 116	256	2.0	2018 2018	[8] [8]
B58/04	Schali W	1.7	0.048	28	67	190	4.8	2010	[8]
A14g/17	Medel W	1.1	0.047	44	99	168	1.1	2018	[8]
B57/11	Arben W	1.1	0.045	42	115	109	1.7	2017	[8]
B85/04	Dolent	1.2	0.044	38 24	68 97	236	0.4+0.7	2013,2020	[8,9,16]
A12e/04	Porchabella	1.7	0.044	24 31	66	109	3.8	2013	[28]
B53/07	Hohbalm	1.7	0.041	25	66	323	1.1	2013	[28]
B55/09	King SW	0.9	0.038	42	122	84	3.0	2017	[8]
C00/08	Zwischbergen	1.3	0.038	30	71	224	1.6	2018	[8]
E23/03	Misaun Castol N	0.8	0.037	45 21	89 77	62 100	4.0	2017	[8]
B31/02	Jaegi	1.3	0.037	26	66	109	3.3 1.5	2017	[8]
B73/24	Aig. Rouges Z	0.8	0.036	46	108	185	0.8	2018	[8]
B74/18	Prafleuri	0.8	0.036	42	84	106	2.0	2018	[8]
A51e/37	Tiefen Mains C	2.2	0.034	16 72	54	304	5.9	2012	[15]
B72/06 B75/06	Moiry S Granddesort	0.5 1 1	0.033	72 30	154 69	231 127	15.8 2.2	2012	[10] [8]
A56d/01	Dungel	0.6	0.033	56	112	82	2.6	2017	[8]
C84/09	Cantun	0.8	0.032	44	134	69	2.9	2017	[8]
A50j/06	Im Griess	1.2	0.032	33	71	160	4.0	2018	[8]
C93/09	Cambrena	1.3	0.032	26 20	56	102	3.7	2017	[8,30]
A140/10	Guief N	1.1	0.032	27	03	102	3.4	2010	lol
Commued	on mext Page								

Table S1: List of	glaciers	with GPR	data	(continued)
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SGI-id	Glacier Name	A	$V_{2016}$	Interpolat	ion	$d_{\rm mean-gp}$	r p. length	GPR survey	GPR survey
		(km <sup>2</sup> )	(km <sup>3</sup> 5)	$h_{\rm mean}(m)$	) $h_{\max}(m)$	(m)	(km)	year(s)	references <sup>1</sup>
B74/11	Darrey	1.3	0.030	23	73	271	1.4	2018	[8]
B85/08	Neuve N	1.3	0.030	23	59	261	0.1+1.4	2013,2020	[8,9,16]
B21/05 B26/19	Diablerets	0.7	0.029	39	68 72	1240	11.7	2010	[18] [0]
A14n/01	Vorab	0.8	0.029	26	63	109	3.2	2017	[8]
B23/03	Wildhorn NE	0.8	0.028	34	86	92	3.5	2017	[8]
B55/19	Langflue Z	0.9	0.027	30	72	185	1.8	2017	[8]
E45/08	Grialetsch	1.2	0.026	24	59	250	2.4	2017	[8]
B55/16	Alphubel	0.8	0.026	31	81	120	1.9	2017	[8]
B57/19	Rothorn Zerm.	0.8	0.026	32	69 52	105	2.1	2017	[8]
A54e/13 C85/06	Bondasca	1.5	0.025	17 26	53 60	144 82	10.4+1.1	2013,2020	[8,9,10]
A14m/09	Punteglias	0.7	0.025	42	136	58	3.1	2017	[8]
E44/04	Sarsura	0.9	0.025	34	68	97	2.9	2017	[8]
B52/06	Rotblatt S	0.7	0.024	34	93	87	1.9	2018	[8]
B43/12	Tiertaelli	1.0	0.024	25	74	155	9.5	2008	[4]
A55f/01	Ammerten	0.9	0.024	27	71	116	2.8	2017	[8]
A51h/15	Titlis	0.6	0.024	38	69	350	0.5	1994	[19]
A510/04 A54i/10	Benfen	0.7	0.023	41 27	98 110	150	1.4	2018	[8]
A14n/05	Frisal W	0.5	0.022	48	127	86	1.7	2019	[8]
E23/04	Tschierva	0.6	0.021	39	84	87	1.7	2017	[8]
A51d/07	Bocktschingel	0.8	0.019	31	80	78	2.6	2018	[8]
A51d/06	Ruchen	0.8	0.019	29	73	70	3.0	2018	[8]
B93/06	Plan Neve NE	0.6	0.019	32	71	305	0.5	2013	[6]
C01/07	Laggin	0.7	0.018	25	59	129	1.3	2018	[8]
B/4/09 C14/10	Luette Basodino	0.6	0.018	30 14	00 25	108	1.4	2018	[8] [10]
A55c/11	Lammeren	0.57	0.018	31	23 83	69	2.7	2000	[19]
E45/11	Grialetsch E	0.83	0.018	26	62	102	2.4	2017	[8]
A55c/14	Steghorn	0.35	0.017	50	114	56	1.8	2017	[8]
C01/09	Holutrift	0.55	0.017	29	67	174	1.0	2018	[8]
A14f/15	Lavaz	0.64	0.017	26	87	342	0.4	2018	[8]
B62/13	Turtmann	0.26	0.017	63	122	164	11.1	2012	[16]
E35/1/ A1/f/12	Valdraus	0.61	0.01/	28 37	/4 80	/1 168	2.5	2017	[8]
A141/12 A55f/08	Chilchli	0.43	0.010	37 43	83	61	3.6	2018	[8]
B30/28	Tellin SW	0.56	0.016	27	70	96	8.2	2012,2019	[8,16]
B75/12	Montfort	0.58	0.016	27	58	21	5.2	2013,2018	[6,8]
A14c/03	Fanell	0.87	0.016	19	51	125	2.5	2018	[8]
A56d/04	Gelten NE	0.72	0.015	21	43	267	1.9	2017	[8]
A56d/05	Gelten SW	0.51	0.015	29	67	121	1.3	2017	[8]
B55/3/ C02/02	Bodmer	0.40	0.015	33 27	/1 71	48 100	3.3 1 1	2017	[8]
A13n/04	Zapport	1.30	0.013	12	30	320	0.5	2018	[8]
B75/09	Mont Fort	0.35	0.014	39	102	100	0.5	2018	[8]
A14l/22	Gliems	0.47	0.013	34	65	78	1.8	2018	[8]
A14l/11	Cavrein	0.38	0.012	37	83	92	1.2	2018	[8]
A50i/13	Todi N	0.41	0.011	33	60	74	1.4	2018	[8]
A501/18	Sand W	0.43	0.011	31 27	03	353	0.3	2018	[8] [9]
A50J/0/ A51h/34	Stotzig Fgg	0.35	0.011	36	92 84	125	1.0	1004	[0] [10]
B44/03	Mutt	0.36	0.011	27	54	71	1.5	2009	[6]
A51d/18	Stalden	0.48	0.011	22	44	97	0.9	2018	[8]
B30/27	Tennbach	0.30	0.010	33	59	87	3.3	2012,2019	[8,16]
A50i/17	Sand E	0.43	0.010	29	46	201	0.6	2018	[8]
A14d/17	Lenta	0.77	0.010	17	36	275	1.2	2018	[8]
A51I/10 E22/11	Stel	0.36	0.0098	28	59 40	82 191	8.0+1.3	2013,2020	[8,9,16]
E22/11 B31/16	FOILEZZA Jegi W	0.45	0.0090	23 27	42 51	101	0.0	2017	[0] [8]
C01/03	Talli W ZwBerg	0.38	0.0094	26	59	122	0.8	2018	[8]
A14p/03	Segnes	0.51	0.0090	20	57	297	1.2	2011	[6]
B73/34	Tsijiore Nouve	0.27	0.0087	32	80	145	0.2	2016	[8]
B75/07	Petit Mont Fort	0.26	0.0086	33	56	128	0.5	2018	[8]
A55d/05	Strubel	0.38	0.0086	23	46	71	1.5	2017	[8]
C14/05	Sexrouge	0.26	0.0081	31 22	5/ /1	28 222	3.1 0.7	2012 2018	[0] [8]
044/02 B58/26	Hohlicht	0.42	0.0081	22 31	+1 53	∠33 187	0.7	2010	[0] [8]
A55b/30	Kander SW	0.32	0.0080	29	50	109	0.9	2019	[8]
E42/10	Vallorgia	0.25	0.0078	32	72	88	1.0	2017	[8]
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Table S1:	List o	of glaciers	with GPR	data data	(continued)
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SGI-id	Glacier Name	A	V <sub>2016</sub>	Interpolat	ion	$d_{\rm mean-gpt}$	<sub>r</sub> p. length	GPR survey	GPR survey
		(km <sup>2</sup> )	(km <sup>3</sup> 5)	$h_{\rm mean}(m)$	$h_{\max}(m)$	(m)	(km)	year(s)	references
E35/19	Err S	0.29	0.0075	27	58	82	0.9	2017	[8]
E35/15	Agnel	0.28	0.0074	27	66	85	1.1	2017	[8]
A14f/11	Sut	0.32	0.0073	23	43	76	1.1	2018	[8]
E23/02	Misaun S	0.25	0.0072	30	58	57	1.2	2017	[8]
C01/10	Sibiluflue	0.23	0.0068	29	63	115	0.4	2018	[8]
B32/05	Stampbach	0.20	0.0068	33	86	216	7.6	2013	[16]
A14m/05	Urlaun S	0.33	0.0066	24	48	174	0.7	2018	[8]
B36/11	Distel	0.33	0.0064	18	42	117	0.4	2017	[8]
E23/16	Murtel	0.30	0.0063	22	42	83	0.7	2013	[6]
B23/07	Wildhorn SW	0.26	0.0061	23	48	47	2.0	2017	[8]
E35/13	Trauntr Ovas W	0.20	0.0060	31	67	66	0.9	2017	[8]
A55f/07	Ammerte	0.33	0.0058	18	56	117	2.1	2017	[8]
B52/26	Fluchthorn W	0.27	0.0057	22	41	348	29.5	2008,2013	[16]
A51d/08	Halsifirn	0.29	0.0056	24	86	89	0.4	2018	[8]
A55b/16	Loetsche	0.73	0.0053	12	27	709	0.1	2018	[18]
A15b/04	Sardona	0.43	0.0052	15	29	268	0.5	2011	[6]
E23/18	Corvatsch	0.22	0.0046	22	48	90	1.2	2013	[6]
A12i/03	Err N	0.20	0.0044	23	49	88	1.3	2017	[8]
E42/08	Scalettawest	0.19	0.0041	23	42	100	0.7	2017	[8]
A51e/12	Sanktanna	0.20	0.0039	19	39	61	0.8	2013	[6]
A50j/13	Gruppen NE	0.16	0.0032	24	46	123	0.3	2018	[8]
A50i/25	Glarner Todi E	0.17	0.0030	23	53	55	0.8	2018	[8]
E33/01	Guglia	0.09	0.0030	33	59	62	0.3	2017	[8]
A51e/10	Gurschen	0.14	0.0029	21	37	46	0.8	2013	[6]
B47/05	Homattu N	0.16	0.0027	15	34	62	0.6	2018	[8]
A12e/10	Porchabella nw	0.07	0.0024	34	63	50	0.7	2017	[8]
E42/13	Porchabella ne	0.08	0.0023	29	55	93	0.7	2017	[8]
A12i/04	Piz d'Err N	0.10	0.0022	23	42	48	0.6	2017	[8]
B73/37	Vouasson S	0.05	0.0017	31	73	137	0.6	2018	[8]
B73/01	Tsarmine	0.09	0.0014	16	26	38	0.9	2015	[2]
A54m/02	Eigerwest	0.08	0.0013	19	41	69	0.6	1993	[19]
B45/35	Blinnenhorn	0.08	0.0013	13	71	173	6.8	1999	[5]
A50d/01	Pizol	0.07	0.0011	17	37	6	4.1	2010	[10]
C84/17	Bondasca	0.05	0.0008	17	36	121	0.8	2017	[8]
A55d/08	Grosstrubel NE	0.06	0.0008	13	24	85	0.3	2017	[8]
A51e/08	Schwarzbach	0.05	0.0005	10	15	133	0.1	2013	[6]
A55c/25	Grosstrubel SW	0.03	0.0003	11	20	73	0.3	2017	[8]
A12j/02	Err NW	0.02	0.0003	18	35	28	0.8	2017	[8]
A22/02	Blauschnee	0.03	0.0002	12	19	15	0.9	2011	[6]

<sup>1</sup>**GPR survey references:** [1] Bauder et al. (2003)<sup>b</sup>; [2] Capt et al. (2016)<sup>a</sup>; [3] Farinotti et al. (2009) after Thyssen and Ahmad (1969); [4] Farinotti et al. (2009)<sup>a</sup>; [5] Feiger et al. (2018)<sup>a</sup>; [6] Fischer et al. (2013)<sup>a</sup>, Huss and Fischer (2016)<sup>a</sup>; [7] VAW (1998)<sup>b</sup>; [8] Grab et al. (2020); [9] Grab et al. (2020) acquired in 2020; [10] Huss (2010)<sup>a</sup>; [11] Huss et al. (2008)<sup>a</sup>; [12] unpublished GPR data from 2008 (ETHZ) and 2012 (UZH, UFR)<sup>a</sup>; [13] Huybrechts et al. (2008); [14] Lüthi (2000)<sup>b</sup>; [15] Moll (2012)<sup>a</sup>; [16] Rutishauser et al. (2016)<sup>a</sup>; [17] Sugiyama et al. (2008)<sup>a</sup>; [18] unpublished GPR data form UFR<sup>a</sup>; [19] unpublished GPR data ETHZ<sup>b</sup>; [20] Waechter and Roethlisberger (1982)<sup>b</sup>; [21] Roethlisberger and Funk (1987)<sup>b</sup>; [22] Gudmundsson (1994) and Funk et al. (1994)<sup>b</sup>; [23] Lüthi (1994)<sup>b</sup>; [24] Sharp et al. (1993); [25] VAW (2010)<sup>b</sup>; [26] VAW (2011)<sup>b</sup>; [27] VAW (2012)<sup>b</sup>; [28] VAW (2014a)<sup>b</sup>; [29] VAW (2014b)<sup>b</sup>; [30] VAW (2017a); [31] VAW (2017b); [32] VAW (2019) <sup>a</sup>retrieved from GlaThiDa Consortium (2019),<sup>b</sup>retrieved from GLAMOS (2020a)

Table S2: List of glaciers (with  $V_{2016} \ge 0.02 \text{ km}^3$ ) for which no GPR data were used for ice thickness modelling. The following information is provided: Areas according to the SGI2016 (*A*), glacier volumes ( $V_{2016}$ ), mean thickness ( $h_{\text{mean}}$ ) and maximum thickness ( $h_{\text{max}}$ ) of the interpolated ice thickness distributions. For glaciers for which we acquired GPR data in spring 2020, mean distance to closest GPR point ( $d_{\text{mean}-\text{gpr}}$ ) and the total profile lengths are listed.

SGI-id	Glacier Name	A	$V_{2016}$	Interpolation		$d_{\rm mean-gpr}$	profile length
		(km <sup>2</sup> )	(km <sup>3</sup> )	$h_{\rm mean}(m)$	$h_{\max}(m)$	(m)	(km)
A51g/05	Glatt (Erstfeld)	2.8	0.129	46	96	344	1.3
A51f/10	Damma	3.8	0.124	33	64	-	-
B40/06	Trift W (Fiescher)	1.9	0.091	45	102	-	-
B84/15	Valsorey	2.0	0.088	43	88	160	4.0
B82/41	Tsesette	2.1	0.081	39	75	-	-
B56/26	Breithorn (Zermatt)	2.0	0.069	36	64	-	-
A55b/02	Bluemlisalp (BE)	2.2	0.067	36	81	-	-
A51g/11	Bluemlisalp (UR)	2.2	0.066	36	68	174	3.6
A51f/23	Flachenstein	2.3	0.064	28	55	-	-
B36/17	Driest	1.8	0.062	32	63	-	-
A51f/15	Chelen	1.8	0.059	34	90	190	1.4
B84/17	Tseudet	1.5	0.058	38	77	230	2.3
B84/04	Boveire	1.7	0.058	35	64	210	2.5
B51/13	Trift SE (Saas Grund)	1.6	0.055	35	91	-	-
B83/15	Follats	1.2	0.048	39	82	-	-
A54i/03	Grienbargli	1.3	0.046	35	58	-	-
A51g/18	Schlossberg (Erstfeld)	1.4	0.045	33	68	220	2.3
A51f/34	Ruti	1.5	0.045	30	54	-	-
B57/02	Matterhorn	1.6	0.043	27	49	-	-
A14n/08	Gavirolas	1.3	0.042	40	78	-	-
A54i/02	Hiendertellti	1.3	0.042	32	65	-	-
B72/07	Bricola	1.1	0.041	36	63	-	-
A51f/24	Wallenbur	1.4	0.041	29	55	-	-
B52/22	Seewjinen	1.4	0.040	30	69	-	-
A55b/18	Balmhorn	1.3	0.040	31	63	-	-
B90/04	Grands	1.5	0.039	26	45	121	2.4
B58/12	Abberg	1.1	0.038	35	68	-	-
A54l/38	Chall	0.8	0.036	45	90	-	-
A54g/25	Baechli	1.1	0.034	31	67	-	-
A55c/05	Schwarz	1.1	0.034	30	70	-	-
B72/08	Dent Blanche	1.1	0.034	31	57	-	-
B72/10	Manzettes	1.0	0.034	35	85	-	-
B51/05	Gruebu	1.0	0.034	32	62	-	-
B58/15	Ustelli	0.8	0.032	38	71	-	-
A54h/04	Grueben	1.1	0.030	28	62	-	-
A51e/35	Sidelen	1.0	0.030	30	55	-	-
B40/09	Finsteraahorn S	1.1	0.028	25	44	-	-
B33/02	Joli	0.9	0.028	31	59	-	-
A51f/13	Rotfirn	0.9	0.028	30	53	-	-
B84/11	Sonadon	0.9	0.027	29	76	169	1.7
B82/30	Epicoune	0.9	0.026	29	64	-	-
A54m/15	Schmadri	1.0	0.026	32	76	-	-
B41/05	Baechi	1.0	0.026	24	55	-	-
A51f/69	Maasplangg	0.8	0.026	31	50	199	0.6
B51/09	Fletschhorn	0.6	0.024	39	99	-	-
A51f/11	Sonadon	0.9	0.024	27	47	-	-
A10g/08	Verstankla	0.8	0.023	33	68	-	-
A51h/02	Griessen	0.9	0.023	32	69	177	1.2
A51f/32	Kartigel	1.0	0.023	23	55	-	-
B95/09	Mont Ruan E	0.7	0.023	30	61	-	-
B72/09	Dent Blanche SW	0.7	0.022	33	57	-	-
A54I/14	Schreck	0.8	0.022	31	50	-	-
B44/17	Geren	0.7	0.022	31	55	-	-
A51e/20	Witenwasseren	0.7	0.022	34	66	-	-
A51e/23	Mutten	0.8	0.021	30	55	-	-
Continued	on Nevt Dage						

SGI-id	Glacier Name	A (km <sup>2</sup> )	V <sub>2016</sub> (km <sup>3</sup> )	Interpolati $h_{\text{mean}}(m)$	on $h_{\max}(m)$	$d_{ m mean-gpr}$ (m)	profile length (km)
B74/15	Ecoulaies	0.8	0.021	28	55	-	-
A51f/19	Brunnen W	0.7	0.020	28	46	-	-
A54f/07	Alpli	0.9	0.020	23	49	-	-
Smaller gla	ciers for which GPR data w	ere record	led in 2020	):			
A51g/12	Schloss (Isenthal)	0.73	0.0175	30	53	141	1.1
A51h/13	Firnalpeli	0.68	0.0171	25	54	169	0.8
B85/13	Planreuses	0.58	0.0169	29	46	252	0.6
B85/11	Treutsebo	0.38	0.0107	28	56	140	1.0
B85/20	Ravines Rousses	0.34	0.0102	30	62	94	1.0
A51h/11	Grassen	0.41	0.0085	21	39	216	0.4
A51h/22	Spannort SW	0.32	0.0079	25	42	96	0.6
A51h/23	F+B74irnalpeli E	0.30	0.0058	19	32	133	0.4
A51h/10	Grassen E	0.27	0.0056	21	36	278	0.2
A51g/10	Chessel	0.27	0.0049	23	41	84	0.7
A51h/08	Spannort SW	0.20	0.0040	21	31	153	0.3
A51f/86	Glatt	0.07	0.0017	25	44	101	0.6
A51h/26	Schloss	0.05	0.0011	23	41	140	0.5
1094 furthe	er glaciers	122.6	2.48	17	125	0	0.0

Table S2: List of glaciers without GPR data (continued)

# 2 Maps: GPR-coverage, ice thickness distribution, glacier bed topography



Figure S2: Region A, south-western Valais: (a) in blue are the glaciers for which no GPR data has been measured to date. In red are glaciers for which GPR data exists, with the color-code indicating the density of the data coverage expressed by the mean of the distances of all points on the glacier to the closest GPR-measurement point. Gray lines indicate location of the GPR-measurement points. (b) Interpolated ice thickness distribution. (c) Hillshade of the glacier-bed topography within SGI2016 outlines and color-coded the depth of overdeepenings. Background: Hillshade from the swissALTI3D after Swisstopo (2019)



Figure S3: Region B, north-western Valais: (a) in blue are the glaciers for which no GPR data has been measured to date. In red are glaciers for which GPR data exists, with the color-code indicating the density of the data coverage expressed by the mean of the distances of all points on the glacier to the closest GPR-measurement point. Gray lines indicate location of the GPR-measurement points. (b) Interpolated ice thickness distribution. (c) Hillshade of the glacier-bed topography within SGI2016 outlines and color-coded the depth of overdeepenings. Background: Hillshade from the swissALTI3D after Swisstopo (2019)



Figure S4: Region C, south-eastern Valais: (a) in blue are the glaciers for which no GPR data has been measured to date. In red are glaciers for which GPR data exists, with the color-code indicating the density of the data coverage expressed by the mean of the distances of all points on the glacier to the closest GPR-measurement point. Gray lines indicate location of the GPR-measurement points. (b) Interpolated ice thickness distribution. (c) Hillshade of the glacier-bed topography within SGI2016 outlines and color-coded the depth of overdeepenings. Background: Hillshade from the swissALTI3D after Swisstopo (2019)



Figure S5: Region D, Bernese Alps: (a) in blue are the glaciers for which no GPR data has been measured to date. In red are glaciers for which GPR data exists, with the color-code indicating the density of the data coverage expressed by the mean of the distances of all points on the glacier to the closest GPR-measurement point. Gray lines indicate location of the GPR-measurement points. (b) Interpolated ice thickness distribution. (c) Hillshade of the glacier-bed topography within SGI2016 outlines and color-coded the depth of overdeepenings. Background: Hillshade from the swissALTI3D after Swisstopo (2019)



Figure S6: Region E, Uri Alps (rotated): (a) in blue are the glaciers for which no GPR data has been measured to date. In red are glaciers for which GPR data exists, with the color-code indicating the density of the data coverage expressed by the mean of the distances of all points on the glacier to the closest GPR-measurement point. Gray lines indicate location of the GPR-measurement points. (b) Interpolated ice thickness distribution. (c) Hillshade of the glacier-bed topography within SGI2016 outlines and color-coded the depth of overdeepenings. Background: Hillshade from the swissALTI3D after Swisstopo (2019)



Figure S7: Region F, Glarus Alps: (a) in blue are the glaciers for which no GPR data has been measured to date. In red are glaciers for which GPR data exists, with the color-code indicating the density of the data coverage expressed by the mean of the distances of all points on the glacier to the closest GPR-measurement point. Gray lines indicate location of the GPR-measurement points. (b) Interpolated ice thickness distribution. (c) Hillshade of the glacier-bed topography within SGI2016 outlines and color-coded the depth of overdeepenings. Background: Hillshade from the swissALTI3D after Swisstopo (2019)



Figure S8: Region G, southern Grisons: (a) in blue are the glaciers for which no GPR data has been measured to date. In red are glaciers for which GPR data exists, with the color-code indicating the density of the data coverage expressed by the mean of the distances of all points on the glacier to the closest GPR-measurement point. Gray lines indicate location of the GPR-measurement points. (b) Interpolated ice thickness distribution. (c) Hillshade of the glacier-bed topography within SGI2016 outlines and color-coded the depth of overdeepenings. Background: Hillshade from the swissALTI3D after Swisstopo (2019)

### 3 Ice thickness distribution and overdeependings

From the data contained in SwissGlacierThickness-R2020, the total ice volume for individual river catchments can be calculated. This is shown in Fig. S9a, where the volumes homogenized for the year 2016 are displayed. We differentiated the catchments of the main river systems Rhône, Rhine, Po, and Inn, which all have their sources in the Swiss Alps. For catchments definitions see Fig. S10. Furthermore, the ice thickness distribution across specific elevation bands was calculated. The result is shown in Fig. S9b. It becomes evident that the maximum ice volume (asterisk symbol in Fig. S9) occurs at substantially different elevations for the different regions and therefore it is expected that the hydrology of each region responds differently to changes in climate. It is important to note here that the ice thickness distributions are given for the inventory years defined by the DEM (swissALTI3D, r2019) and thus exhibit some heterogeneity. These years are provided in SwissGlacierThickness-R2020 in the form of raster data and are displayed in Fig. S11. More details about the temporal meta data were presented by Weidmann et al. (2018).

We also analyzed the glacier bed topography provided in SwissGlacierThickness-R2020 with regard to the volumes of overdeepening. The locations of anticipated overdeepenings are displayed in Fig. S3-S8 with the color code indicating their depth. The volumes of these overdeepenings provide an estimate of future lake volumes. In Fig. S9c, the largest lake volumes are displayed separately for the corresponding glaciers. For the smaller lake volumes the volumes summed over several glaciers are shown. We note that more than half of this lake volumes occur in the glacier beds of only four glaciers.



Figure S9: (a) Total ice volumes of glaciers located within the watersheds of the rivers Rhone Rhone, Rhine, Inn and Po. (b) Hypsometric ice volume distribution of the four river catchments and entire Swiss Alps, with elevation values referring to the mean of glacier bed and surface. Asterisk symbols indicate elevations where maximum volumes occur. (c) Sum of potential glacier lake volumes by lake volume classes (per glacier) with the four glaciers with largest lakes shown individually.



Figure S10: Dark colors: Outlines of Swiss glaciers color-coded by main watersheds. Light colors: watersheds within Swiss borders. In gray is the Adige watershed, which contains no glaciers within the Swiss borders.



Figure S11: Recording years of the 2019-release of swissALTI3D (Swisstopo, 2019), reproduced from its metadata. (a) youngest year, (b) oldest year, (c) most frequently occurring (mode) year.

## 4 Supplementary Figures of the Uncertainty Analysis

In our publication, we present in Appendix C the calculation of point-specific ice thickness uncertainties  $u^{\pm}(x,y)$ . One of the components considered for computing  $u^{\pm}(x,y)$  is the uncertainties of the ice thickness interpolation  $u_{int}^{\pm}(x,y)$ . For illustrating the calculation of  $u_{int}^{\pm}(x,y)$ , explained in detailed in the main manuscript, a supplementary illustration is provided here in Fig. S12.

Apart from the calculation of the uncertainty of the total ice volume in the Swiss Alps  $\bar{u}_V$ , explained in detail in Appendix D of our publication, we also computed the glacier-specific uncertainties of the ice volumes. Resulting values of these glacier-specific uncertainties are presented here in Fig. S13 for absolute uncertainties and in Fig. S14 for uncertainties normalized by each glacier's mean ice thickness.



Figure S12: Deviations  $\Delta h$  of modelled and measured ice thickness normalized with the glacier-specific mean ice thickness  $\bar{h}_i$  versus distance *d* to the closest ice thickness observation. Gray-scale image: number of points falling within the corresponding area of the plot, normalized by maximum values within each discrete distance interval of 50 m width. Red symbols: median and  $2\sigma$ -confidence intervals for each distance interval. Blue lines: linear regression over distances up to 500 m, within which this data set is densely populated. See also Appendix C of the main manuscript.



Figure S13: a) Distribution of ice volume uncertainties of individual glaciers,  $\bar{u}_{V,i}$ , for specific classes of mean ice thicknesses  $\bar{h}_i$  and separated for glaciers for which GPR data exists (red), for which no GPR data exists (yellow) and for glaciers with/without GPR data combined (black). For the calculation of  $\bar{u}_{V,i}$  see equation 4 of the main manuscript. Number of glaciers falling into certain mean ice thickness classes are listed. b) same as in (a) but not separated by classes of mean ice thicknesses. c)-f), same as in a) but for the individual components considered for computing  $\bar{u}_{V,i}$ , i.e. the input quantities of equation 4. Boxplots represent median, 25<sup>th</sup> and 75<sup>th</sup> percentiles, range without outliers and outliers.



Figure S14: Same as Fig. S13 but with uncertainties normalized by each glacier's mean ice thickness.

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