Supplementary Information for **“Silicon Isotopes in Arctic and sub-Arctic Glacial Meltwaters: The Role of the Subglacial Weathering in the Silicon Cycle”,** authored by Jade E. Hatton, Katharine R. Hendry, Jonathan R. Hawkings, Jemma, L. Wadham, Sophie Opfergelt,Tyler J. Kohler, Jacob C. Yde,Marek Stibal, and Jakub D. Žárský, published in Proceedings of the Royal Society A.

**Supplementary Table 1. Compilation of silicon concentrations and calculated Si yields from a range of glacierized catchments**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Glacier | Year | Location | Mean DSi Concentration (µmol L-1) | DSi yield  (ton km-2 a-1) | Published data |
| Greenland | **Kuannersuit** | 2001 | 69°40’ N 53°17’ W | 146 | 25.99 | Yde *et al.* [1] |
| **Kulusuk** | 2013 | 65°42 N 38°27’’ W | 6.8 | - | Aciego *et al.* [2] |
| **Leverett Glacier (2015)** | 2015 | 67° 06’ N 50° 17’ W | 20.8 | 1.83 | Hatton *et al.* [3] |
| **Kiattuut Sermiat (2013)** | 2013 | 61° 20’N 45° 30’ W | 22.2 | 3.54 | Hatton *et al.* [3] |
| **Watson River 2007** | 2007 | 67° N 50° W | 35.6 | 0.40 | Yde *et al.* [4] |
| **Watson River 2008** | 2008 | 67° N 50° W | 21.4 | 0.19 | Yde *et al.* [4] |
| **Watson River 2009** | 2009 | 67° N 50° W | 42.7 | 0.32 | Yde *et al.* [4] |
| Iceland | **Langjökull** | 1996 | 65° 45’ N 19° 59’ W | Not Reported | 14.3 | Gislason *et al.* [5] |
| **Hvita-south, Gullfoss** | 1973 | 64° 19’ N 20° 07’ W | 233 | 13.7 | Gislason *et al.* [5], Hodson *et al.* [6] |
| **Hvita-west, Kljafoss** | 1973 | ~64° 19’ N 20° 07’ W | 198 | 10.0 | Gislason *et al.* [5], Hodson *et al.* [6] |
| Svalbard | **Scott Turnerbreen** |  | 78°06’ N 15°57’ E | 3.9 | 0.36 | Hodgkins *et al.* [7] |
| **Midre Lovenbreen** | 1998 | 78° 52’ N 11° 57’ E | Not Reported | 0.27 | Hodson *et al.* [8] |
| **Midre Lovenbreen** | 1999 | 78° 52’ N 11° 57’ E | Not Reported | 0.22 | Hodson *et al.* [8] |
| **Austre Brøggerbreen** | 1999 | ~79°N, 12°E | Not Reported | 0.08 | Hodson *et al.* [8] |
| **Bayelva Catchment  (Austre Brøggerbreen and Vestre Brøggerbreen)** | 1991 | ~79°N, 12°E | 4.33 | 0.07 - 0.14 | Hodson *et al.* [9] |
| **Bayelva Catchment  (Austre Brøggerbreen and Vestre Brøggerbreen)** | 1992 | ~79°N, 12°E | 3.50 | 0.06 - 0.12 | Hodson *et al.* [9] |
| North America | **Worthington Glacier** | 1995 | 61° 10’ N 145° 45’ W | Not Reported | 4.02 | Anderson *et al.* [10] |
| **Kennicott Glacier** | 2000 | 61° 30’ N 143° 00’ W | 33 | 4.84 | Anderson *et al.* [11] |
| **Lewis River, Barnes Ice Cap** | 1964 | 70° 0’ N 73° 30’ W | Not Reported | 0.09 | Church [12] |
| **Berendon Glacier** | 1975 | 56° 14’ N 130° 10’ W | Not Reported | 0.51 - 1.87 | Eyles *et al.* [13] |
| **South Cascade Glacier** | 1992 | 48° 21’ N 121° 3’ W | Not Reported | 1.87 | Reynolds and Johnson [14] |
| Himalayas | **Batura Glacier** | 1999 | 35° 44’ N 76° 22’E | 24.9 | 1.12 | Hodson *et al.* [15] |
| **Gangotri Glacier** | 2007 | 30°43’ N 78°59’ E | 64 | 8.63 | Srivastava [16], Singh *et al.* [17] |
| Swiss Alps | **Rhone Glacier** | 2000 | 46°35’ N 8°23’ E | Not Reported | 3.96 - 4.83 | Hosein *et al.* [18] |
| **Oberaar Glacier** | 2000 | 46°32’ N 8°14’ E | Not Reported | 4.80 | Hosein *et al.* [18] |
| **Haut Glacier d’Arolla** | 1990 | 45° 59’N 7° 29’ E | Not Reported | 1.96 - 2.15 | Sharp *et al.* [19] |

**Supplementary Table 2: Sample information for the new data presented in this study.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Glacier | Location | Latitude | Longitude | Date | Time | | Temp (°C) | Sample ID |
| Disko 6 | Qeqertarsuaq | 69.715833° | -53.441617° | 4/8/2015 | 1600 | 0.1 | | D6 |
| Disko 10 | Qeqertarsuaq | 69.766717° | -53.413400° | 6/8/2015 | 1520 | 0.1 | | D10 |
| Disko 11 | Qeqertarsuaq | 69.784050° | -53.427200° | 6/8/2015 | 1800 | 2.2 | | D11 |
| Disko 13 | Qeqertarsuaq | 69.801817° | -53.375900° | 9/8/2015 | 1700 | 0.1 | | D13 |
| Kuannersuit | Qeqertarsuaq | 69.687500° | -53.291450° | 3/8/2015 | 2030 | 0.8 | | KG |
| Nansenbreen | Svalbard | 78.353145° | 14.075243° | 2/8/2016 | 1345 | 0.9 | | Nan |
| Sefströmbreen | Svalbard | 78.719740° | 14.374894° | 4/8/2016 | 2030 | 0.8 | | Sef |
| Ebbabreen | Svalbard | 78.726805° | 16.794599° | 6/8/2016 | 1630 | 0.6 | | Ebba |
| Langjökull | Iceland | 64.496778° | -20.227667° | 15/8/2016 | 1400 | - | | Lang |
| Sólheimajökull | Iceland | 63.534833° | -19.352194° | 16/8/2016 | 1500 | - | | Sol |
| Skaftafellsjökull | Iceland | 64.028667° | -16.932667° | 17/8/2016 | 1100 | - | | Skaf |
| Eyjabakkajökull | Iceland | 64.666250° | -15.723694° | 18/8/2016 | 1500 | - | | Eyja |
| Drangajökull | Iceland | 66.117611° | -22.287750° | 20/8/2016 | 1400 | - | | Drang |
| Styggedalsbreen | Norway | 61.488306° | 7.880444° | 22/9/2016 | 1400 | 0.7 | | Sty |
| Austerdalsbreen | Norway | 61.588500° | 6.995333° | 24/9/2016 | 1400 | 0.3 | | Aus |
| Bøverbreen | Norway | 61.556694° | 8.049500° | 25/9/2016 | 1400 | 0.7 | | Bov |
| Herbert | Alaska | 58.539120° | -134.684540° | 27/6/2017 | 1230 | 0.3 | | HE |
| Mendenhall | Alaska | 58.403990° | -134.581670° | 30/6/2017 | 1030 | 3.6 | | ME |
| Lemon | Alaska | 58.364320° | -134.478740° | 29/6/2017 | 1115 | 5.3 | | LE |
| Eagle | Alaska | 58.528640° | -134.805680° | 29/6/2017 | 1400 | 3.7 | | EA |
| Watson River | Greenland | 67.007460° | -50.680240° | 12/9/2017 | 1000 | 0.3 | | Wat |

**Supplementary Table 3: Summary of hydrochemical and isotopic results from the range of glaciers presented in this study.** Area refers to the glacierised part of the catchment, rather than the total catchment area. EC = Electrical Conductivity, D:M = Divalent ion (Ca2+ +Mg2+) : Monovalent ion (K+:Na+) ratio, ASi = Amorphous silica concentration, DSi = Dissolved silicon concentration.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample | pH | EC  (µS cm-1) | D:M  (µeq) | DSi  (µmol l-1) | δ30SiDSi  (‰) | ASi  (%) | δ30SiAsi  (‰) | Area (km2) |
| D6 | 7.2 | 7.9 | 1.66 | 15.8 | 0.22 | 0.49 | -0.55 | 1.50 |
| D10 | 8.7 | 7.7 | 4.65 | 23.3 | -0.15 | 0.49 | -0.48 | 7.00 |
| D11 | 6.9 | 9.9 | 1.38 | 7.92 | -0.36 | 0.43 | -0.61 | 9.70 |
| D13 | 7.5 | 9.0 | 0.54 | 34.8 | 0.24 | 0.50 | ­­­­-0.67 | 18.0 |
| KG | 8.7 | 13.8 | 0.95 | 33.8 | -0.13 | - | - | 103 |
| Nan | 7.2 | 70 | 32.16 | 4.56 | -0.07 | 0.12 | -0.66 | 38.1 |
| Sef | 8.3 | 108 | 143.7 | 3.31 | 0.18 | 0.09 | -0.27 | 133 |
| Ebba | 7.6 | 112 | 18.1 | 3.03 | 0.16 | 0.10 | -0.71 | 1.68 |
| Lang | 8.3 | 28.3 | 1.45 | 49.4 | -0.58 | 0.23 | -0.10 | 131 |
| Sol | 8.8 | 48.0 | 0.88 | 94.8 | 0.78 | 2.10 | -0.06 | 55.1 |
| Skaf | 9.4 | 30.5 | 0.85 | 39.3 | -0.09 | 0.55 | -0.18 | 90.5 |
| Eyja | 8.2 | 5.6 | 1.91 | 16.5 | -0.51 | 1.72 | -0.05 | 130 |
| Drang | 8.5 | 6.5 | 0.83 | 13.6 | -0.14 | 0.59 | -0.36 | 41.9 |
| Sty | 7.5 | 3.0 | 3.75 | 10.7 | -0.09 | 0.66 | -0.31 | 2.06 |
| Aus | 6.7 | 25 | 5.28 | 26.6 | 0.63 | 0.28 | -0.34 | 20.9 |
| Bov | 6.1 | 2.0 | 1.11 | 4.95 | 0.53 | 0.13 | -0.54 | 9.58 |
| HE | 7.7 | 21 | 4.22 | 13.5 | 0.49 | 0.34 | -0.62 | 61.2 |
| ME | 8.0 | 26 | 3.98 | 17.4 | 0.59 | 0.44 | -0.54 | 109 |
| LE | 7.8 | 38 | 7.56 | 24.6 | 0.46 | 0.14 | -0.86 | 9.53 |
| EA | 8.1 | 18 | 3.33 | 18.4 | 0.33 | 0.64 | - | 40.5 |
| Wat | 8.5 | 36 | 0.47 | 33.2 | 0.31 | 1.47 | -0.30 | 6100 |

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