Supplementary file for: Andrews, J.A., Kristjánsdóttir, G.B., Eberl, D.D. & Jennings, A.E. 2013. A quantitative x-ray diffraction inventory of volcaniclastic inputs into the marine sediment archives off Iceland: a contribution to Volcanoes in the Arctic System. Correspondence: John T. Andrews, Institute of Arctic and Alpine Research and Department of Geological Sciences, University of Colorado, P.O. Box 450, Boulder, CO 80309, USA. E-mail: andrewsj@colorado.edu.

Supplementary Table S2. Results of running experiments on different amorphous silica materials and volcanic glass and tephra. See Supplementary File 1 for details.

| (a) Sample name: | Saks2 | Saks3 | Saks1 | Hekla-4 | Helka-4 | 2317diatoms | qrtz40min | Basalt #1 | Basalt #2 | Basalt #3 |
|---|---|---|---|---|---|---|---|---|---|---|
| Full pattern degree of fit: | 0.1186 | 0.1626 | 0.1177 | 0.0926 | 0.0786 | 0.0944 | 0.1515 | 0.1837 | 0.1909 | 0.1598 |
| Mineral | wt% | wt% | wt% | wt% | wt% | wt% | wt% | wt% | wt% | wt% |
| **Non-clays** | | | | | | | | | | |
| Quartz | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 46.3 | 0.0 | 0.0 | 0.0 |
| Ordered microcline feldspar | 1.5 | 0.0 | 0.9 | 0.3 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 |
| Intermediate microcline feldspar | 2.0 | 1.7 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Orthoclase feldspar | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 |
| Anorthoclase feldspar | 13.4 | 12.5 | 12.8 | 9.4 | 6.1 | 1.1 | 0.1 | 4.0 | 17.1 | 11.3 |
| Albite feldspar | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 | 0.9 | 0.0 |
| Oligoclase feldspar | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | 0.0 |
| Labradorite feldspar | 0.8 | 1.6 | 0.0 | 2.9 | 4.4 | 0.0 | 0.0 | 24.4 | 11.5 | 17.9 |
| Bytownite feldspar | 0.0 | 5.4 | 0.9 | 0.0 | 0.1 | 0.0 | 0.0 | 15.8 | 9.2 | 17.9 |
| Anorthite feldspar | 7.4 | 9.7 | 6.5 | 3.0 | 3.4 | 0.0 | 0.1 | 7.9 | 11.8 | 6.4 |
| Amphibole | 1.8 | 2.5 | 2.6 | 0.7 | 0.6 | 0.0 | 2.3 | 0.9 | 0.7 | 0.4 |
| Pyroxene | 5.4 | 8.1 | 7.1 | 0.3 | 0.5 | 0.0 | 0.0 | 28.9 | 19.8 | 26.0 |
| Pyrite | 0.4 | 0.7 | 0.2 | 0.0 | 0.1 | 0.0 | 0.2 | 0.5 | 0.1 | 0.3 |
| Magnetite | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 | 0.0 | 4.5 | 4.2 | 2.5 |
| Hematite | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Maghemite | 3.5 | 2.1 | 4.2 | 1.5 | 1.6 | 0.0 | 0.0 | 4.6 | 5.4 | 4.8 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total non-clays less amorphous** | 36.4 | 44.4 | 35.8 | 18.1 | 16.7 | 3.3 | 50.0 | 92.2 | 80.7 | 87.6 |
| White River glass | 15.0 | 18.8 | 21.1 | 21.3 | 31.0 | 71.5 | 0.0 | 0.1 | 0.2 | 0.9 |
| Diatoms | 10.2 | 13.2 | 9.9 | 11.7 | 15.8 | 43.4 | 12.8 | 4.9 | 0.0 | 0.0 |
| Chert (8.4 nm) | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 37.6 | 0.0 | 0.0 | 0.0 |
| **Total amorphous silica** | 26.2 | 32.1 | 31.0 | 33.0 | 46.8 | 115.1 | 50.4 | 5.0 | 0.2 | 0.9 |
| **Total non-clays** | 62.6 | 76.5 | 66.8 | 51.0 | 63.5 | 118.4 | 100.4 | 97.2 | 80.9 | 88.5 |
| **Clays** | | | | | | | | | | |
| Saponite | 16.8 | 12.3 | 1.9 | 1.4 | 0.8 | 0.0 | 0.0 | 13.3 | 6.2 | 10.0 |
| 1m illite (r>2; 88%i) | 1.2 | 0.2 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 2.2 | 2.0 | 0.0 |
| 1M illite (R>1. 70-80%I) | 3.4 | 0.5 | 3.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Biotite (1M) | 1.2 | 0.8 | 0.9 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Fe-chlorite (Tusc) | 4.4 | 3.6 | 4.6 | 3.3 | 2.9 | 4.1 | 0.0 | 0.0 | 0.0 | 0.7 |
| Muscovite (2M1) | 0.1 | 0.3 | 0.0 | 0.0 | 0.1 | 0.9 | 0.0 | 0.0 | 4.2 | 0.0 |
| Illite (1M. PD3B) | 4.0 | 0.5 | 2.8 | 2.3 | 1.3 | 1.7 | 0.0 | 1.6 | 1.9 | 1.1 |
| **Total clays** | 31.0 | 18.3 | 13.8 | 7.5 | 5.1 | 6.6 | 0.0 | 17.1 | 14.2 | 11.8 |
| **Total** | 93.7 | 94.8 | 80.6 | 58.5 | 68.6 | 125.0 | 100.4 | 114.3 | 95.1 | 100.3 |

| (b) | Sample name: | Saks2 | Saks3 | Saks1 | Hekla-4 | Helka-4 | 2317diatoms | qrtz40min | Basalt #1 | Basalt #2 | Basalt #3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Full pattern degree of fit: | 0.1206 | 0.1552 | 0.1184 | 0.0824 | 0.0727 | 0.0907 | 0.1439 | 0.1834 | 0.1910 | 0.1602 |
| | Mineral | wt% | wt% | wt% | wt% | wt% | wt% | wt% | wt% | wt% | wt% |
| | **Non-glass** | 38.8 | 42.2 | 37.3 | 16.3 | 14.4 | 4.9 | 51.0 | 87.9 | 80.4 | 88.3 |
| | Opal | 2.3 | 0.0 | 0.0 | 0.2 | 0.0 | 18.1 | 0.0 | 1.0 | 0.0 | 0.0 |
| | Obsidian | 15.0 | 17.9 | 14.2 | 21.6 | 30.8 | 55.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| | White River glass | 7.0 | 9.1 | 11.9 | 11.1 | 18.4 | 30.1 | 11.4 | 1.6 | 1.3 | 0.5 |
| | Diatoms | 3.9 | 4.8 | 5.6 | 5.1 | 0.4 | 3.4 | 0.0 | 0.7 | 0.0 | 0.0 |
| | Chert (8.4 nm) | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 1.6 | 38.6 | 0.0 | 0.0 | 0.0 |
| | **Total amorphous** | 29.1 | 31.8 | 31.6 | 38.0 | 49.6 | 108.3 | 50.0 | 3.4 | 1.3 | 0.5 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **silica** | | | | | | | | | |
| | **Total non-clays** | 67.9 | 74.0 | 69.0 | 54.3 | 64.0 | 113.3 | 101.0 | 91.3 | 81.6 | 88.8 |
| | **Total clays** | 27.1 | 20.4 | 14.4 | 4.5 | 5.0 | 7.9 | 0.0 | 16.1 | 13.3 | 11.4 |
| | **TOTAL** | 95.1 | 94.5 | 83.4 | 58.8 | 69.1 | 121.2 | 101.0 | 107.4 | 95.0 | 100.1 |
| | | | | | | | | | | | |
| (c) | Sample name: | Saks2 | Saks3 | Saks1 | Hekla-4 | Helka-4 | 2317diatoms | qrtz40min | Basalt #1 | Basalt #2 | Basalt #3 |
| | Full pattern degree of fit: | 0.1011 | 0.1268 | 0.1024 | 0.0781 | 0.0692 | 0.0961 | 0.1479 | 0.1833 | 0.1898 | 0.1592 |
| | Mineral | wt% | wt% | wt% | wt% | wt% | wt% | wt% | wt% | wt% | wt% |
| | **Total non-clays less amorphous** | 33.3 | 40.2 | 32.6 | 14.7 | 13 | 3.4 | 55.5 | 90.7 | 79.9 | 86.3 |
| | Opal | 0 | 0 | 0 | 1.7 | 0 | 17.2 | 0 | 0.9 | 0 | 0 |
| | Obsidian | 8.1 | 2.9 | 0 | 6 | 9.8 | 19.5 | 0 | 0 | 0 | 0 |
| | White River glass | 4.8 | 4.9 | 5.7 | 4.7 | 5.9 | 10 | 1.1 | 0.4 | 0 | 0 |
| | Hekla glass | 23.2 | 18.6 | 18.2 | 21 | 27.6 | 49.7 | 1.3 | 0.5 | 0 | 0 |
| | Diatoms | 1.3 | 0 | 0 | 1.2 | 1.4 | 3.6 | 0 | 0.3 | 0 | 0 |
| | Chert (8.4 nm) | 0.9 | 0 | 0 | 0 | 0 | 0.9 | 34.2 | 0 | 0 | 0 |
| | Saks glass | 5.3 | 10.1 | 17.5 | 7 | 7.4 | 10.3 | 9 | 3.7 | 5.7 | 6.7 |
| | **Total glass** | 33.3 | 33.6 | 41.4 | 32.7 | 40.9 | 70 | 11.4 | 4.6 | 5.7 | 6.7 |
| | **Total amorphous silica** | 43.6 | 36.5 | 41.4 | 41.6 | 52.1 | 111.2 | 45.6 | 5.8 | 5.7 | 6.7 |
| | **Total non-clays** | 76.7 | 76.8 | 73.9 | 56.5 | 65.1 | 114.6 | 101 | 96.5 | 85.6 | 93.3 |
| | **Total clays** | 17.1 | 12.2 | 9.2 | 3.2 | 3.6 | 4.9 | 0 | 16.6 | 12.9 | 9.6 |
| | **TOTAL** | 93.9 | 88.9 | 83 | 59.8 | 68.7 | 119.5 | 101 | 113.1 | 98.4 | 102.9 |
| | | | | | | | | | | | |
| | Sample name: | Saks2 | Saks3 | Saks1 | Hekla-4 | Helka-4 | 2317diatoms | qrtz40min | Basalt #1 | Basalt #2 | Basalt #3 |
| | Full pattern degree of fit: | 0.107826 | 0.127169 | 0.099365 | 0.0769464 | 0.067469 | 0.098392801 | 0.191769896 | 0.18167809 | 0.1867356 | 0.15708257 |
| (d) | Mineral | wt% | wt% | wt% | wt% | wt% | wt% | wt% | wt% | wt% | wt% |
| | **Total non-clays less amorphous** | 32.9 | 35.9 | 26.6 | 11.7 | 10.6 | 1.0 | 69.5 | 81.8 | 72.6 | 79.5 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Opal | 0.0 | 0.0 | 0.0 | 2.5 | 1.3 | 18.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| Obsidian | 6.9 | 3.5 | 0.0 | 4.7 | 6.9 | 14.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| White River tephra | 4.6 | 4.6 | 5.7 | 4.5 | 5.6 | 9.0 | 0.8 | 0.0 | 0.0 | 0.0 |
| White River glass | 3.2 | 2.7 | 2.7 | 2.9 | 3.7 | 6.4 | 0.7 | 0.0 | 0.0 | 0.0 |
| Hekla tephra | 3.6 | 3.7 | 4.0 | 3.3 | 4.4 | 7.5 | 0.0 | 0.0 | 0.0 | 0.0 |
| Hekla glass | 18.1 | 14.0 | 13.0 | 15.9 | 21.0 | 37.7 | 3.8 | 0.0 | 0.0 | 0.0 |
| Diatoms | 1.7 | 0.4 | 0.0 | 1.0 | 1.4 | 3.5 | 0.7 | 0.0 | 0.0 | 0.0 |
| Chert (8.4 nm) | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 10.6 | 0.0 | 0.0 | 0.0 |
| Saks tephra | 7.9 | 14.9 | 22.2 | 8.6 | 8.7 | 11.7 | 9.4 | 15.7 | 16.8 | 15.2 |
| Saks glass | 0.7 | 1.3 | 3.5 | 1.6 | 1.7 | 2.1 | 1.3 | 0.0 | 1.3 | 0.0 |
| **total amorphous silica** | 47.6 | 45.1 | 51.1 | 45.0 | 54.7 | 112.0 | 27.3 | 15.7 | 18.1 | 15.2 |
| **Total non-clays** | 80.6 | 81.1 | 77.8 | 56.6 | 65.4 | 113.1 | 96.9 | 97.5 | 90.7 | 94.7 |
| **Total clays** | 21.0 | 13.5 | 11.7 | 2.8 | 3.3 | 5.4 | 4.1 | 11.5 | 7.0 | 7.5 |
| **TOTAL** | 101.7 | 94.6 | 89.5 | 59.4 | 68.7 | 118.5 | 101.1 | 109.0 | 97.8 | 102.2 |