## SUPPLEMENTARY INFORMATION

### Source of data for Wrangell and Iceland datasets used in Fig. 2 and Fig. DR3.

All data presented here, with the exception of the Icelandic dataset, are single grain glass analyses extracted from the University of Alberta tephrochronology database. All data were collected at the University of Alberta microprobe lab on the JEOL 8900 using settings discussed previously (e.g. Jensen et al., 2008, 2011). Not all the data included in the compilation have been published, but all samples included are reference samples of tephra beds that have been described in the literature.

Most Wrangell tephra have not been sourced due to proximal erosion of deposits by glacier activity. Therefore the tephras used in this compilation are limited to samples that exhibit clear characteristics considered unique to this source. Transitional or ambiguous tephra that may be from Wrangell or upper Alaska Peninsula volcanoes (e.g. Hayes) have been excluded, but those tephra tend to plot within the major-element geochemical range of Wrangell tephra and are only distinguishable by trace-element geochemistry (Preece et al., 2004, 2011).

1. Wrangell: Sheep Creek (SC)-Klondike, SC-Fairbanks, SC-Canyon Creek, Lucky Lady, Beiderman, Chester Bluff, Charlie River, Andrew Creek, Kandik River, White River Unknown (WRUN)1, WRUN2, WRUN3, White River Ash northern and eastern lobes (Preece et al., 2004, 2011; Jensen et al., 2008; Westgate et al., 2008; Turner et al., 2013).
2. 
3. Icelandic data: compiled from Tephrabase (www.tephrabase.org, and references therein), includes all rhyolitic analyses available in the database excluding AD860B and any other tephra that have not been clearly linked to an Icelandic source. To ensure examples from as many Icelandic centers as possible are represented, this dataset has been supplemented with glass analyses from Larson et al. (2002), Gudmundsdóttir et al. (2011, 2012), Thornally et al. (2012) and Jennings et al. (2014).

## DATA REPOSITORY FIGURES AND TABLE

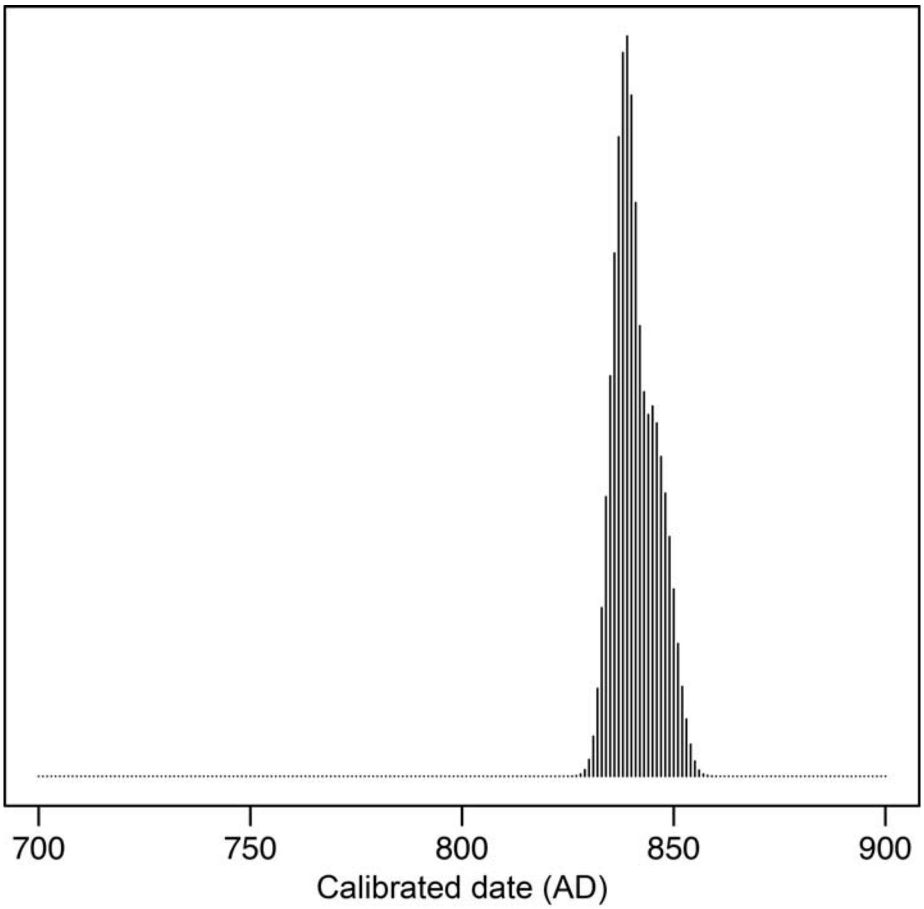


Figure DR1. Plot of the marginal posterior estimate for the calibrated date of the WRAe based on newly determined, high precision, radiocarbon ages on tree-rings from a spruce tree killed by the eruption (Table DR1). The associated 95% HPD interval is 833-850AD. This calibrated age was estimated using a tailored statistical approach that accounts for the blocked nature of the dated material (i.e. multiple tree-rings per dated sample), for the correlated nature of the radiocarbon calibration curve (in this case IntCal04, Reimer et al, 2004), and for the prior information about the relative ages of the samples. Details on the statistical model and dates are available in McColl (2008).

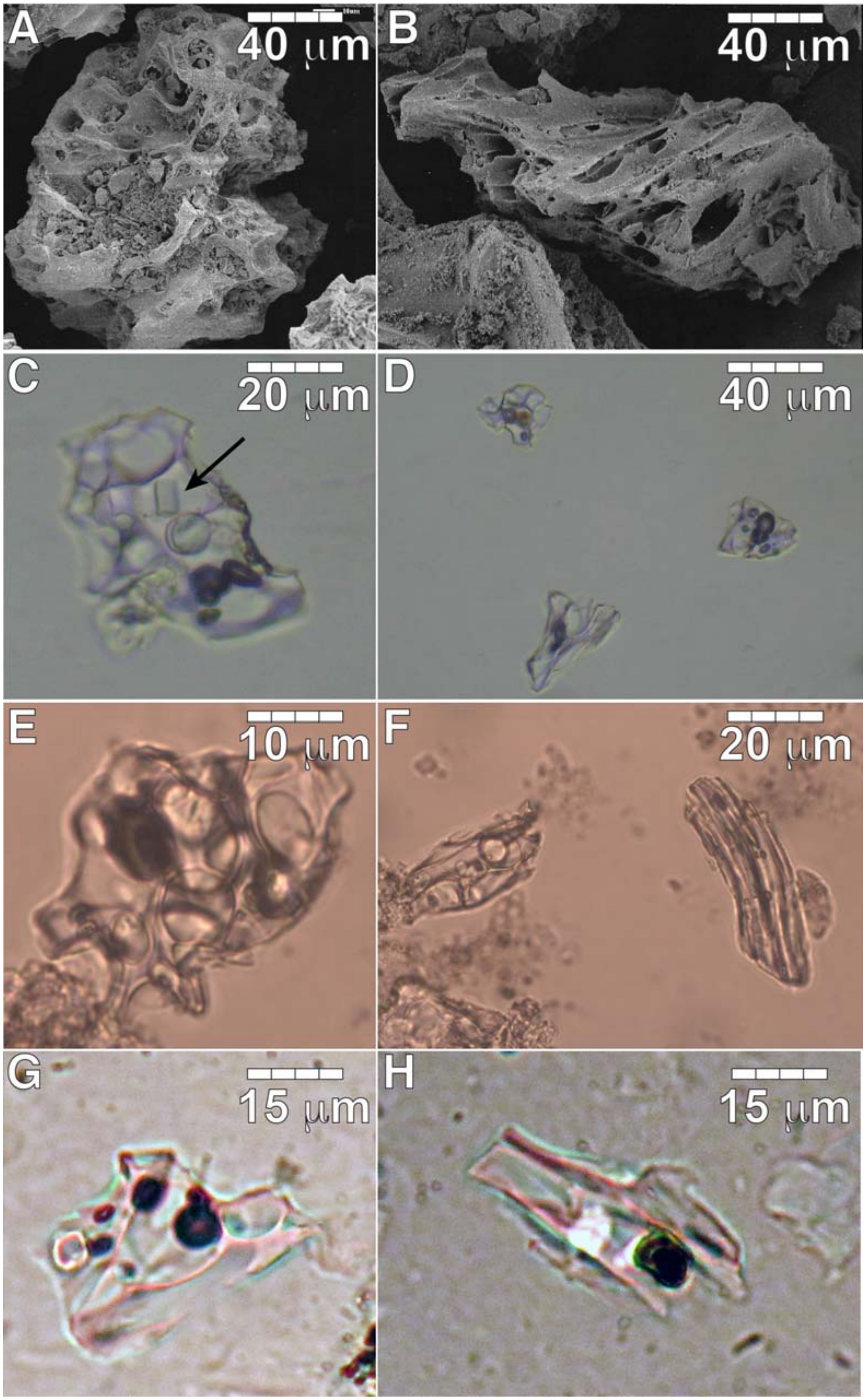

Figure DR2. SEM images and microphotographs illustrating typical glass shard morphologies for WRAe and AD860B tephras. A,B: WRAe (UA 1119) is almost entirely comprised of highly vesicular pumice (A); stretched pumice is also present (B). Blocky shards, containing fewer vesicles, are less abundant. C,D: WRAe from Nordan's Pond Bog (NDN 160; Pyne-O'Donnell et al., 2012) illustrates the continuity of morphology across great distances; this sample was predominantly frothy pumice (C) but also contained stretched pumice and the some blocky shards (D). Microlites (C) are also occasionally found in distal samples, something that should be expected considering their abundance in proximal material. E,F: AD860B from Sluggan Bog (QUB-108; Pilcher et al., 1995) has the same morphological characteristics as glass from WRAe; it consists almost entirely of highly vesicular pumice with thin glass walls, and some stretched pumice. G,H: AD860B from Germany (DOM-2, van den Bogaard and Schmincke, 2002) again shows the consistency in morphology between all samples, supporting the other data which suggests these tephra correlate to one another. It should be noted that Icelandic tephra generally contain platy and fluted glass shards with less vesicular pumice. While some contain highly vesicular (i.e. frothy) pumice shards, it is rare for those shards to be the predominant glass morphology as is seen in WRAe. Rhyolitic tephra from Hekla are one exception, but WRAe/AD860B does not share any geochemical characteristics with material from that volcano.

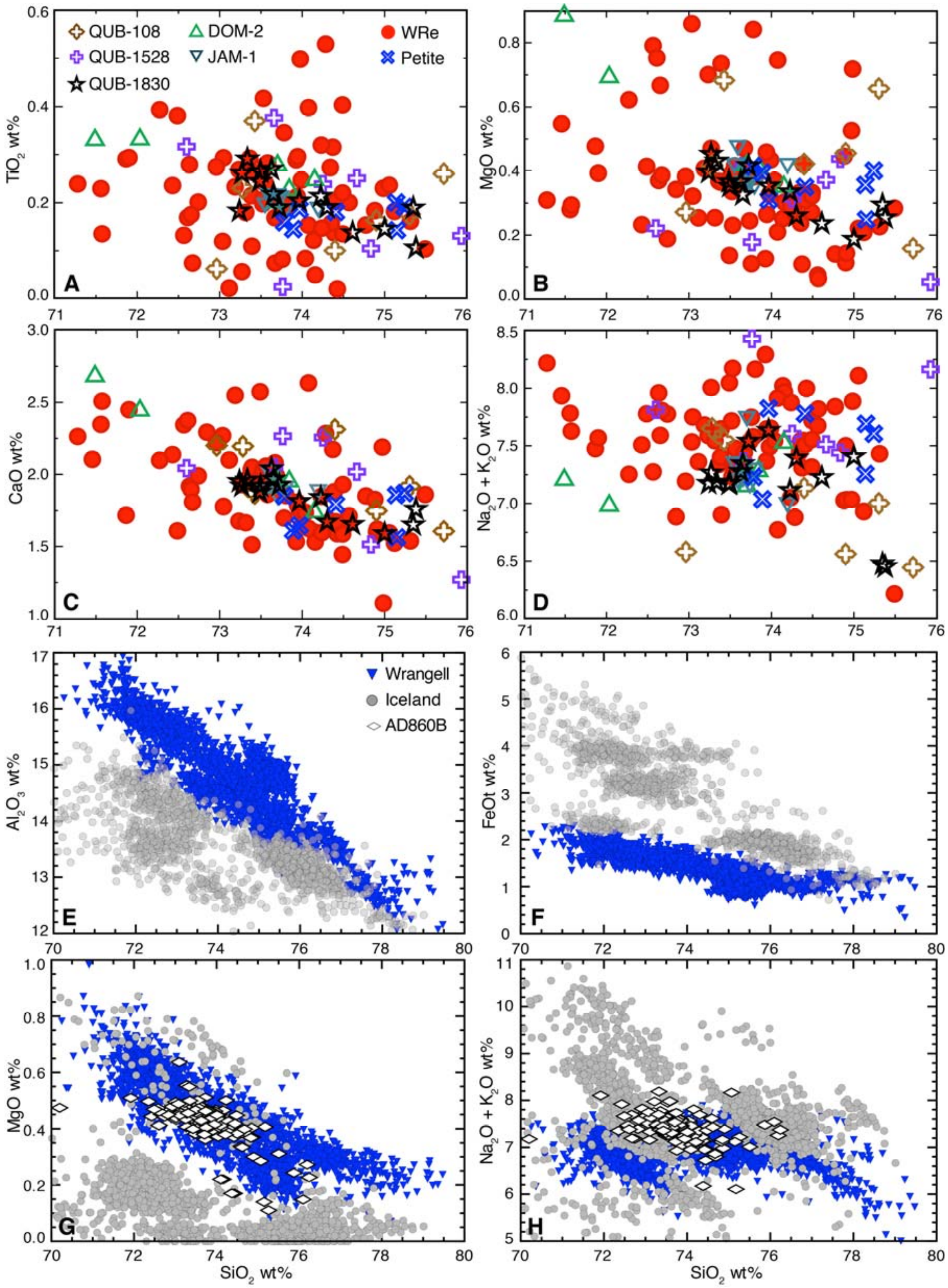


Figure DR3. Additional Harker diagrams illustrating major-element geochemical relationships between the AD860B samples, WRAe, and the Wrangell and Icelandic tephras. A,B,C,D: A series of additional Harker diagrams further illustrate the similarity of glass analyses between AD860B samples and WRAe. Although some individual samples do not capture the entire geochemical range seen in WRAe, this appears to be an artifact of the number of analyses. For example, DOM-2/JAM-1 (6 and 7 shards, respectively) have no shards above ~74.1 $SiO_2$ wt%, but original analyses published in van den Bogaard and Schmincke (2002) show these samples contain shards with up to 75.26 $SiO_2$ wt%. E,F: Removing AD860B dataset clarifies how $Al_2O_3$ and FeOt wt% can discriminate more readily between Icelandic and Wrangell sourced tephra, although there is overlap above ~77 $SiO_2$ wt%. This difference may be related to the water content within the system producing the tephra. The high percentage of amphibole within Wrangell rhyolites indicates a water-saturated system, whilst studies of Icelandic dacites and rhyolites suggest formation in water under-saturated systems (resulting in pyroxenes, rather than amphibole, as a major accessory mineral). Experiments seeking to produce Icelandic rhyolitic magma have shown that if amphibole exists in the residuum, it produces higher $Al_2O_3$ and lower FeOt wt% rhyolites compared to what actually exists (Thy et al., 1990), which reflects the difference seen between the Wrangell and Icelandic rhyolites. G: Although there is greater scatter in MgO wt% data, this oxide can also be useful when discriminating between datasets. H: Total alkali-silica (TAS) plots are commonly used by the tephra community, but this plot illustrates how it does not clearly distinguish between these two regions. This sounds a cautionary note regarding the practice of plotting “unknown” northern European cryptotephras on TAS plots augmented with Icelandic volcanic fields to source them.

**Table DR1.** New $^{14}C$ ages from in-situ stump of a spruce tree killed by eruption.

| Location | Dated Material | $^{14}C$ yr BP (error 1σ) | Lab number |
|---|---|---|---|
| Little Boundary Creek, Yukon Territory (61 34' N 140 53' W) | Rings 5-7 | 1175 (15) | UCIAMS-68585 |
| | Rings 47-49 | 1175 (15) | UCIAMS-68586 |
| | Rings 83-85 | 1285 (15) | UCIAMS-68587 |
| | Rings 115-118 | 1255 (15) | UCIAMS-68588 |
| | Rings 151-169 | 1270 (15) | UCIAMS-68589 |
| | Rings 209-215 | 1445 (15) | UCIAMS-68590 |
| | Rings 257-261 | 1480 (15) | UCIAMS-68591 |

**Table DR2.** Glass major-element compositions of WRAe (UA 1119) and AD860B, normalized to 100% on a volatile free basis. Previously published analyses of AD860B and secondary standard analyses for ID3506 are included for comparison.

| Sample | | $SiO_2$ | $TiO_2$ | $Al_2O_3$ | $FeO_t$ | MnO | MgO | CaO | $Na_2O$ | $K_2O$ | Cl | Total | $H_2O_d$ | n | source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UA 1119 | MN | 73.65 | 0.19 | 14.34 | 1.60 | 0.07 | 0.38 | 1.91 | 4.31 | 3.21 | 0.34 | 100 | 2.91 | 79 | *this study* |
| reference | SD | 0.97 | 0.12 | 0.63 | 0.33 | 0.20 | 0.22 | 0.30 | 0.31 | 0.36 | 0.08 | | 1.73 | | |
| QUB-108 | MN | 74.50 | 0.22 | 14.26 | 1.37 | -0.13 | 0.47 | 1.94 | 4.10 | 2.96 | 0.31 | 100 | 4.37 | 6 | *this study* |
| SB, N.I. | SD | 0.99 | 0.09 | 0.41 | 0.28 | 0.14 | 0.19 | 0.27 | 0.43 | 0.36 | 0.05 | | 1.30 | | |
| JAM-1 | MN | 73.75 | 0.21 | 14.42 | 1.54 | 0.06 | 0.40 | 1.92 | 4.22 | 3.08 | 0.40 | 100 | 3.03 | 7 | *this study* |
| Germany | SD | 0.21 | 0.01 | 0.17 | 0.08 | 0.02 | 0.04 | 0.05 | 0.20 | 0.05 | 0.07 | | 1.75 | | |
| DOM-2 | MN | 73.15 | 0.27 | 14.54 | 1.70 | 0.07 | 0.52 | 2.11 | 4.14 | 3.11 | 0.40 | 100 | 3.58 | 6 | *this study* |
| Germany | SD | 1.10 | 0.05 | 0.32 | 0.30 | 0.02 | 0.22 | 0.36 | 0.14 | 0.09 | 0.11 | | 2.16 | | |
| QUB-1528 | MN | 74.24 | 0.21 | 13.94 | 1.30 | -0.02 | 0.28 | 1.92 | 4.47 | 3.29 | 0.38 | 100 | 3.57 | 7 | *this study* |
| NGRIP | SD | 1.05 | 0.12 | 0.52 | 0.30 | 0.16 | 0.14 | 0.38 | 0.27 | 0.40 | 0.11 | | 3.39 | | |
| QUB-1830* | MN | 74.07 | 0.21 | 14.51 | 1.51 | 0.04 | 0.33 | 1.83 | 3.84 | 3.32 | 0.41 | 100 | 2.59 | 14 | *this study* |
| NEEM | SD | 0.76 | 0.05 | 0.27 | 0.16 | 0.05 | 0.08 | 0.14 | 0.37 | 0.14 | 0.04 | | 3.31 | | |
| Petite Bog† | MN | 74.51 | 0.17 | 14.23 | 1.40 | 0.05 | 0.35 | 1.74 | 4.23 | 3.26 | NA | 100 | 2.75 | 7 | *this study* |
| Canada | SD | 0.65 | 0.02 | 0.76 | 0.13 | 0.01 | 0.06 | 0.13 | 0.22 | 0.18 | - | | 0.65 | | |
| N.Ireland | MN | 73.45 | 0.28 | 14.89 | 1.57 | NA | 0.45 | 1.93 | 4.26 | 3.17 | NA | 100 | 2.36 | 106 | *Pilcher et al., 1995§* |
| all | SD | 0.62 | 0.03 | 0.52 | 0.08 | - | 0.04 | 0.13 | 0.21 | 0.15 | - | | 1.35 | | |
| JAM-1 | MN | 74.43 | 0.15 | 14.44 | 1.43 | 0.06 | 0.39 | 1.93 | 4.03 | 3.13 | 0.35 | 100 | 2.87 | 8 | *van den Bogaard & Schminke, 2002* |
| Germany | SD | 0.31 | 0.16 | 0.17 | 0.21 | 0.06 | 0.06 | 0.18 | 0.12 | 0.22 | 0.05 | | 0.64 | | |
| DOM-2 | MN | 74.33 | 0.28 | 14.58 | 1.42 | 0.08 | 0.20 | 1.90 | 3.98 | 3.22 | 0.37 | 100 | 2.76 | 10 | *van den Bogaard & Schminke, 2002* |
| Germany | SD | 0.50 | 0.16 | 0.20 | 0.15 | 0.05 | 0.09 | 0.14 | 0.11 | 0.10 | 0.08 | | 0.61 | | |
| QUB-1528 | MN | 74.50 | 0.22 | 14.06 | 1.46 | 0.06 | 0.38 | 1.87 | 4.02 | 3.44 | NA | 100 | 2.84 | 25 | *Coulter et al., 2012§* |
| NGRIP | SD | 0.90 | 0.05 | 0.37 | 0.22 | 0.06 | 0.09 | 0.16 | 0.46 | 0.15 | - | | 1.88 | | |
| NDN 160 | MN | 73.91 | 0.21 | 14.58 | 1.52 | 0.05 | 0.40 | 1.85 | 4.26 | 3.12 | NA | 100 | 2.59 | 24 | *Pyne-O'Donnell et al., 2012* |
| Canada | SD | 0.32 | 0.01 | 0.31 | 0.08 | 0.01 | 0.03 | 0.09 | 0.11 | 0.09 | - | | 0.93 | | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID 3506 | MN | 74.16 | 0.10 | 13.29 | 1.58 | 0.16 | 0.03 | 0.75 | 4.18 | 5.07 | 0.32 | 99.64 | 0.36 | 22 | *this study* |
| Alberta | SD | 0.26 | 0.10 | 0.61 | 0.26 | 0.24 | 0.08 | 0.11 | 0.16 | 0.53 | 0.07 | 0.95 | 0.95 | | |
| ID 3506 | MN | 74.24 | 0.08 | 13.32 | 1.63 | 0.14 | 0.10 | 0.74 | 4.22 | 5.16 | 0.35 | 99.98 | 0.02 | 20 | *this study* |
| Alberta | SD | 0.28 | 0.09 | 0.56 | 0.24 | 0.22 | 0.14 | 0.11 | 0.22 | 0.73 | 0.10 | 0.88 | 0.88 | | |
| ID 3506 | MN | 74.16 | 0.07 | 13.22 | 1.55 | 0.01 | 0.07 | 0.81 | 4.05 | 5.11 | 0.41 | 99.45 | 0.55 | 10 | *this study* |
| Alberta | SD | 0.36 | 0.10 | 0.57 | 0.43 | 0.22 | 0.10 | 0.22 | 0.15 | 0.40 | 0.06 | 1.05 | 1.05 | | |
| ID 3506 | MN | 74.72 | 0.07 | 13.07 | 1.62 | 0.07 | 0.05 | 0.72 | 4.08 | 5.07 | 0.35 | 99.75 | 0.25 | 11 | *this study* |
| Alberta | SD | 0.22 | 0.04 | 0.09 | 0.06 | 0.02 | 0.01 | 0.03 | 0.04 | 0.10 | 0.03 | 0.31 | 0.31 | | |
| ID 3506 | MN | 74.10 | 0.07 | 13.10 | 1.55 | 0.07 | 0.04 | 0.74 | 4.06 | 5.13 | 0.34 | 99.09 | - | | *Kuehn et al., 2011* |
| Assay | SD | 0.96 | 0.03 | 0.34 | 0.06 | 0.03 | 0.02 | 0.05 | 0.28 | 0.26 | 0.03 | - | - | | |
| Lipari | MN | 73.56 | 0.08 | 13.28 | 1.63 | 0.09 | 0.04 | 0.73 | 3.91 | 5.18 | 0.37 | 98.85 | 1.14 | 4 | *this study* |
| Edinburgh | SD | 0.38 | 0.02 | 0.05 | 0.11 | 0.05 | 0.01 | 0.03 | 0.15 | 0.09 | 0.05 | 0.62 | 0.61 | | |
| Lipari | MN | 74.24 | 0.08 | 12.92 | 1.50 | 0.07 | 0.04 | 0.74 | 4.01 | 5.13 | 0.34 | 99.09 | - | | *Edinburgh internal values* |
| Edinburgh | SD | 0.71 | 0.02 | 0.57 | 0.19 | 0.02 | 0.02 | 0.08 | 0.37 | 0.21 | | | - | | |
| ATho | MN | 73.94 | 0.25 | 12.11 | 3.30 | 0.10 | 0.09 | 1.66 | 4.27 | 2.74 | 0.06 | 98.50 | 1.50 | 8 | *this study* |
| Queen's | SD | 0.62 | 0.03 | 0.16 | 0.10 | 0.06 | 0.03 | 0.04 | 0.26 | 0.03 | 0.02 | - | 0.60 | | |
| ATho | | 74.48 | 0.27 | 12.07 | 3.43 | 0.10 | 0.10 | 1.75 | 4.31 | 2.72 | - | 99.42 | - | XRF | *Óskarsson et al., 1982* |
| Assay | | | | | | | | | | | | | - | | |

*Analyzed at Queen's University Belfast; †Analyzed at Edinburgh Tephrochronology Analytical Unit; § also includes unpublished data from J. Pilcher. N.I. = Northern Ireland; SB = Sluggan Bog, NEEM = NEEM-S1-2011. MN = Mean, SD = standard deviation at $1\sigma$ except official values of ID 3506 ($2\sigma$); n = number of analyses; $H_2O_{di}$ = water by difference; FeOt = total Fe as FeO. All data except standards are normalized to 100% on a water-free basis. XRF = X-ray fluorescence

## TABLE DR3. DATA REPOSITORY DATA SET

**Electron microprobe data (WDS): Compositions of individual glass shard analyses, standard data unnormalized, samples normalized to 100% on a volatile free basis.**

| Data set | Sample | SiO2 | TiO2 | Al2O3 | FeOt | MnO | MgO | CaO | Na2O | K2O | Cl | Total | H2Odiff | Comment /number of analyses |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **ID 3506-1** | 73.82 | 0.07 | 13.42 | 1.79 | -0.13 | 0.06 | 0.86 | 4.08 | 4.70 | 0.35 | 99.02 | 0.98 | Secondary Standard Lipari Obsidian |
| | **ID 3506-2** | 74.54 | -0.01 | 13.39 | 1.28 | 0.15 | 0.08 | 0.66 | 4.18 | 4.57 | 0.33 | 99.18 | 0.82 | |
| | **ID 3506-3** | 74.00 | 0.08 | 13.42 | 1.64 | 0.15 | 0.20 | 0.75 | 3.98 | 5.27 | 0.30 | 99.79 | 0.21 | |
| | **ID 3506-4** | 74.38 | -0.03 | 14.17 | 1.78 | 0.65 | 0.02 | 0.89 | 4.25 | 4.36 | 0.32 | 100.80 | -0.80 | |
| | **ID 3506-5** | 74.23 | 0.13 | 12.42 | 1.27 | 0.18 | 0.05 | 0.84 | 4.48 | 4.90 | 0.35 | 98.85 | 1.15 | |
| | **ID 3506-6** | 74.06 | 0.07 | 12.95 | 1.15 | 0.06 | -0.02 | 0.69 | 4.18 | 5.08 | 0.32 | 98.53 | 1.47 | |
| | **ID 3506-7** | 73.86 | 0.00 | 13.09 | 1.50 | 0.50 | 0.12 | 0.70 | 4.28 | 5.98 | 0.30 | 100.33 | -0.33 | |
| | **ID 3506-8** | 74.15 | 0.19 | 14.21 | 1.59 | 0.31 | 0.02 | 0.70 | 4.20 | 5.38 | 0.30 | 101.05 | -1.05 | |
| | **ID 3506-9** | 74.04 | 0.08 | 13.59 | 1.51 | 0.76 | 0.00 | 0.70 | 4.39 | 5.19 | 0.25 | 100.53 | -0.53 | |
| | **Mean** | 74.12 | 0.06 | 13.41 | 1.50 | 0.29 | 0.06 | 0.75 | 4.23 | 5.05 | 0.31 | 99.79 | 0.21 | 9 |
| | **StDev** | 0.22 | 0.07 | 0.53 | 0.22 | 0.27 | 0.06 | 0.08 | 0.14 | 0.46 | 0.03 | 0.87 | 0.87 | |
| | | | | | | | | | | | | | | |
| 1 | **ID3506-1** | 74.06 | 0.32 | 13.02 | 1.84 | 0.02 | -0.08 | 0.60 | 4.22 | 5.41 | 0.28 | 99.70 | 0.30 | |
| | **ID3506-2** | 74.22 | 0.15 | 13.23 | 1.48 | 0.14 | 0.14 | 1.00 | 3.91 | 4.74 | 0.46 | 99.47 | 0.53 | |
| | **ID3506-3** | 74.39 | 0.01 | 12.25 | 1.27 | 0.20 | -0.08 | 0.65 | 4.15 | 5.36 | 0.34 | 98.54 | 1.46 | |
| | **ID3506-4** | 74.20 | 0.16 | 13.00 | 1.98 | 0.03 | -0.10 | 0.61 | 4.48 | 5.51 | 0.37 | 100.23 | -0.23 | |
| | **ID3506-5** | 74.79 | 0.04 | 14.83 | 1.65 | 0.03 | 0.08 | 0.86 | 4.35 | 4.50 | 0.36 | 101.50 | -1.50 | |
| | **ID3506-6** | 74.14 | 0.08 | 12.77 | 1.50 | -0.05 | 0.05 | 0.71 | 4.10 | 5.60 | 0.30 | 99.22 | 0.78 | |
| | **ID3506-7** | 74.32 | 0.15 | 13.57 | 2.08 | -0.12 | 0.02 | 0.63 | 4.04 | 4.16 | 0.22 | 99.08 | 0.92 | |
| | **ID3506-8** | 74.22 | 0.06 | 13.35 | 1.39 | -0.04 | 0.04 | 0.72 | 3.99 | 4.41 | 0.48 | 98.62 | 1.38 | |
| | **ID3506-9** | 74.10 | 0.08 | 13.26 | 1.58 | -0.09 | 0.02 | 0.66 | 4.19 | 4.88 | 0.36 | 99.03 | 0.97 | |
| | **ID3506-10** | 74.39 | 0.04 | 13.77 | 1.64 | 0.34 | 0.14 | 0.83 | 4.13 | 5.38 | 0.38 | 101.04 | -1.04 | |
| | **ID3506-11** | 73.52 | 0.11 | 13.35 | 1.54 | -0.04 | -0.15 | 0.91 | 4.16 | 5.65 | 0.25 | 99.30 | 0.70 | |
| | **ID3506-12** | 73.97 | 0.04 | 12.83 | 2.04 | 0.36 | 0.05 | 0.83 | 3.94 | 5.97 | 0.22 | 100.25 | -0.25 | |
| | **ID3506-13** | 74.09 | 0.35 | 12.52 | 1.35 | 0.04 | 0.00 | 0.79 | 4.22 | 4.44 | 0.28 | 98.07 | 1.93 | |
| | **Mean** | 74.19 | 0.12 | 13.21 | 1.64 | 0.06 | 0.01 | 0.75 | 4.14 | 5.08 | 0.33 | 99.54 | 0.46 | 13 |
| | **StDev** | 0.29 | 0.11 | 0.64 | 0.27 | 0.15 | 0.09 | 0.13 | 0.16 | 0.58 | 0.08 | 0.99 | 0.99 | |
| | | | | | | | | | | | | | | |
| 1 | **Mean** | 74.16 | 0.10 | 13.29 | 1.58 | 0.16 | 0.03 | 0.75 | 4.18 | 5.07 | 0.32 | 99.64 | 0.36 | both sets |
| | **StDev** | 0.26 | 0.10 | 0.61 | 0.26 | 0.24 | 0.08 | 0.11 | 0.16 | 0.53 | 0.07 | 0.95 | 0.95 | |
| | **ID 3506** | **74.10** | **0.07** | **13.10** | **1.55** | **0.07** | **0.04** | **0.74** | **4.06** | **5.13** | **0.34** | **99.09** | | |
| | **Assay** | 0.96 | 0.03 | 0.34 | 0.06 | 0.03 | 0.02 | 0.05 | 0.28 | 0.26 | 0.03 | | | |
| | | | | | | | | | | | | | | |
| 2 | **ID3506-1** | 74.15 | 0.02 | 13.86 | 1.51 | 0.04 | 0.07 | 0.62 | 3.95 | 5.70 | 0.26 | 100.19 | -0.19 | |
| | **ID3506-2** | 73.91 | 0.19 | 13.01 | 1.89 | 0.82 | -0.03 | 0.63 | 4.09 | 4.92 | 0.57 | 99.99 | 0.01 | |
| | **ID3506-3** | 75.08 | 0.04 | 13.82 | 1.40 | 0.08 | 0.06 | 0.83 | 4.30 | 4.31 | 0.45 | 100.38 | -0.38 | |
| | **ID3506-4** | 74.03 | 0.07 | 13.30 | 1.75 | 0.10 | 0.04 | 0.76 | 4.23 | 4.08 | 0.30 | 98.65 | 1.35 | |
| | **ID3506-5** | 73.99 | 0.10 | 13.13 | 1.89 | 0.07 | 0.59 | 0.74 | 4.40 | 5.50 | 0.28 | 100.69 | -0.69 | |
| | **ID3506-6** | 74.21 | 0.14 | 13.81 | 1.55 | 0.21 | 0.05 | 0.69 | 4.49 | 4.59 | 0.28 | 100.02 | -0.02 | |
| | **ID3506-7** | 74.45 | 0.17 | 13.85 | 1.72 | 0.12 | 0.08 | 0.91 | 4.31 | 4.54 | 0.32 | 100.46 | -0.46 | |
| | **ID3506-8** | 74.47 | 0.11 | 14.30 | 1.69 | -0.07 | 0.03 | 0.82 | 3.92 | 5.21 | 0.26 | 100.75 | -0.75 | |
| | **Mean** | 74.29 | 0.10 | 13.64 | 1.68 | 0.17 | 0.11 | 0.75 | 4.21 | 4.86 | 0.34 | 100.14 | -0.14 | 8 |
| | **StDev** | 0.38 | 0.06 | 0.44 | 0.18 | 0.27 | 0.20 | 0.10 | 0.21 | 0.58 | 0.11 | 0.67 | 0.67 | |
| | | | | | | | | | | | | | | |
| 2 | **ID3506-1** | 74.17 | 0.08 | 12.89 | 1.43 | -0.07 | 0.23 | 0.92 | 4.10 | 4.48 | 0.31 | 98.53 | 1.47 | |
| | **ID3506-2** | 74.44 | 0.22 | 14.46 | 1.31 | 0.19 | 0.07 | 0.86 | 4.20 | 4.60 | 0.39 | 100.75 | -0.75 | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **ID3506-3** | 74.09 | 0.00 | 12.84 | 1.49 | 0.21 | 0.00 | 0.78 | 4.10 | 6.16 | 0.38 | 100.05 | -0.05 | |
| | **ID3506-4** | 74.10 | -0.06 | 12.78 | 1.37 | 0.46 | 0.08 | 0.61 | 3.98 | 6.28 | 0.31 | 99.89 | 0.11 | |
| | **ID3506-5** | 73.93 | 0.05 | 13.26 | 1.89 | 0.18 | 0.13 | 0.88 | 4.39 | 4.81 | 0.42 | 99.94 | 0.06 | |
| | **ID3506-6** | 74.09 | -0.05 | 12.52 | 2.27 | 0.07 | 0.02 | 0.75 | 4.10 | 5.15 | 0.27 | 99.20 | 0.80 | |
| | **ID3506-7** | 74.61 | 0.02 | 12.54 | 1.54 | 0.06 | 0.31 | 0.59 | 4.56 | 5.14 | 0.29 | 99.68 | 0.32 | |
| | **ID3506-8** | 74.12 | -0.03 | 13.05 | 1.53 | 0.38 | 0.10 | 0.82 | 4.22 | 5.22 | 0.38 | 99.79 | 0.21 | |
| | **ID3506-9** | 74.20 | 0.02 | 12.91 | 1.87 | 0.05 | 0.02 | 0.59 | 4.02 | 5.20 | 0.61 | 99.47 | 0.53 | |
| | **ID3506-10** | 74.25 | 0.19 | 13.59 | 1.36 | 0.17 | 0.03 | 0.73 | 4.65 | 7.08 | 0.28 | 102.33 | -2.33 | |
| | **ID3506-11** | 74.38 | 0.23 | 13.54 | 1.52 | -0.05 | -0.02 | 0.57 | 4.48 | 5.39 | 0.26 | 100.30 | -0.30 | |
| | **ID3506-12** | 74.06 | 0.05 | 13.01 | 1.70 | -0.19 | 0.17 | 0.80 | 3.91 | 4.78 | 0.25 | 98.54 | 1.46 | |
| | **Mean** | 74.20 | 0.06 | 13.12 | 1.61 | 0.12 | 0.10 | 0.74 | 4.23 | 5.36 | 0.35 | 99.87 | 0.13 | 12 |
| | **StDev** | 0.19 | 0.10 | 0.54 | 0.28 | 0.18 | 0.10 | 0.12 | 0.24 | 0.77 | 0.10 | 1.01 | 1.01 | |
| 2 | **Mean** | 74.24 | 0.08 | 13.32 | 1.63 | 0.14 | 0.10 | 0.74 | 4.22 | 5.16 | 0.35 | 99.98 | 0.02 | both sets |
| | **StDev** | 0.28 | 0.09 | 0.56 | 0.24 | 0.22 | 0.14 | 0.11 | 0.22 | 0.73 | 0.10 | 0.88 | 0.88 | |
| | **ID 3506** | **74.10** | **0.07** | **13.10** | **1.55** | **0.07** | **0.04** | **0.74** | **4.06** | **5.13** | **0.34** | **99.09** | | |
| | **Assay** | 0.96 | 0.03 | 0.34 | 0.06 | 0.03 | 0.02 | 0.05 | 0.28 | 0.26 | 0.03 | | | |
| 3 | **ID 3506-1** | 74.08 | -0.05 | 12.43 | 1.70 | 0.13 | 0.09 | 1.00 | 4.09 | 5.11 | 0.44 | 99.02 | 0.98 | |
| | **ID 3506-2** | 73.81 | 0.09 | 13.80 | 2.01 | -0.25 | -0.02 | 0.74 | 4.23 | 4.98 | 0.44 | 99.83 | 0.17 | |
| | **ID 3506-3** | 74.23 | 0.07 | 13.23 | 1.82 | -0.05 | 0.21 | 0.91 | 4.05 | 5.10 | 0.43 | 100.00 | 0.00 | |
| | **ID 3506-4** | 73.90 | 0.21 | 12.79 | 1.04 | -0.35 | 0.08 | 0.54 | 3.86 | 4.74 | 0.48 | 97.29 | 2.71 | |
| | **Mean** | 74.00 | 0.08 | 13.06 | 1.65 | -0.13 | 0.09 | 0.80 | 4.06 | 4.98 | 0.45 | 99.04 | 0.96 | 4 |
| | **StDev** | 0.19 | 0.10 | 0.59 | 0.42 | 0.21 | 0.09 | 0.20 | 0.15 | 0.17 | 0.02 | 1.24 | 1.24 | |
| 3 | **ID 3506-1** | 74.43 | 0.16 | 13.49 | 1.72 | -0.14 | 0.11 | 0.53 | 4.17 | 4.92 | 0.43 | 99.83 | 0.17 | |
| | **ID 3506-2** | 74.86 | 0.15 | 14.04 | 0.88 | 0.03 | -0.02 | 0.85 | 3.94 | 4.88 | 0.47 | 100.06 | -0.06 | |
| | **ID 3506-3** | 73.67 | -0.10 | 12.78 | 1.89 | -0.04 | 0.06 | 0.98 | 3.97 | 4.55 | 0.30 | 98.07 | 1.93 | |
| | **ID 3506-4** | 73.91 | 0.15 | 13.56 | 2.04 | 0.12 | 0.02 | 0.58 | 3.98 | 5.56 | 0.31 | 100.22 | -0.22 | |
| | **ID 3506-5** | 74.49 | 0.00 | 12.46 | 1.33 | 0.21 | 0.27 | 0.76 | 4.30 | 5.33 | 0.37 | 99.52 | 0.48 | |
| | **ID 3506-6** | 74.26 | -0.02 | 13.60 | 1.08 | 0.40 | -0.05 | 1.22 | 3.91 | 5.92 | 0.38 | 100.70 | -0.70 | |
| | **Mean** | 74.27 | 0.06 | 13.32 | 1.49 | 0.10 | 0.07 | 0.82 | 4.05 | 5.19 | 0.38 | 99.73 | 0.27 | 6 |
| | **StDev** | 0.43 | 0.11 | 0.58 | 0.47 | 0.19 | 0.12 | 0.26 | 0.15 | 0.51 | 0.06 | 0.90 | 0.90 | |
| 3 | **Mean** | 74.16 | 0.07 | 13.22 | 1.55 | 0.01 | 0.07 | 0.81 | 4.05 | 5.11 | 0.41 | 99.45 | 0.55 | both sets |
| | **StDev** | 0.36 | 0.10 | 0.57 | 0.43 | 0.22 | 0.10 | 0.22 | 0.15 | 0.40 | 0.06 | 1.05 | 1.05 | |
| | **ID 3506** | **74.10** | **0.07** | **13.10** | **1.55** | **0.07** | **0.04** | **0.74** | **4.06** | **5.13** | **0.34** | **99.09** | | |
| | **Assay** | 0.96 | 0.03 | 0.34 | 0.06 | 0.03 | 0.02 | 0.05 | 0.28 | 0.26 | 0.03 | | | |
| 4 | **ID3506-1** | 74.50 | 0.05 | 12.95 | 1.65 | 0.06 | 0.05 | 0.73 | 4.08 | 5.05 | 0.32 | 99.37 | 0.63 | |
| | **ID3506-2** | 74.73 | 0.09 | 12.92 | 1.62 | 0.10 | 0.06 | 0.72 | 4.08 | 5.01 | 0.40 | 99.65 | 0.35 | |
| | **ID3506-3** | 74.71 | 0.08 | 13.10 | 1.77 | 0.10 | 0.05 | 0.70 | 4.13 | 5.30 | 0.35 | 100.21 | -0.21 | |
| | **ID3506-4** | 74.65 | 0.05 | 13.08 | 1.63 | 0.07 | 0.06 | 0.75 | 4.05 | 5.04 | 0.30 | 99.61 | 0.39 | |
| | **ID3506-5** | 75.09 | 0.07 | 12.97 | 1.47 | 0.06 | 0.06 | 0.71 | 4.13 | 5.07 | 0.33 | 99.88 | 0.12 | |
| | **Mean** | 74.74 | 0.07 | 13.00 | 1.63 | 0.08 | 0.06 | 0.72 | 4.09 | 5.10 | 0.34 | 99.74 | 0.26 | 5 |
| | **StDev** | 0.21 | 0.02 | 0.08 | 0.11 | 0.02 | 0.01 | 0.02 | 0.03 | 0.12 | 0.04 | 0.32 | 0.32 | |
| 4 | **ID3506-6** | 74.29 | 0.04 | 13.13 | 1.63 | 0.06 | 0.04 | 0.72 | 4.07 | 5.02 | 0.34 | 99.26 | 0.75 | |
| | **ID3506-7** | 75.04 | 0.03 | 13.02 | 1.58 | 0.07 | 0.04 | 0.74 | 4.09 | 4.93 | 0.36 | 99.81 | 0.19 | |
| | **ID3506-8** | 74.85 | 0.08 | 13.14 | 1.62 | 0.07 | 0.06 | 0.72 | 4.09 | 5.14 | 0.35 | 100.03 | -0.03 | |
| | **ID3506-9** | 74.84 | 0.06 | 13.13 | 1.57 | 0.09 | 0.04 | 0.73 | 4.00 | 5.06 | 0.37 | 99.80 | 0.20 | |
| | **ID3506-10** | 75.20 | 0.07 | 13.22 | 1.56 | 0.06 | 0.03 | 0.71 | 4.10 | 5.09 | 0.34 | 100.29 | -0.29 | |
| | **ID3506-11** | 74.90 | 0.16 | 13.17 | 1.55 | 0.05 | 0.06 | 0.66 | 4.11 | 5.10 | 0.33 | 100.01 | -0.01 | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Mean** | 74.85 | 0.07 | 13.13 | 1.58 | 0.07 | 0.04 | 0.71 | 4.08 | 5.06 | 0.35 | 99.87 | 0.13 | 6 |
| | **StDev** | 0.31 | 0.04 | 0.06 | 0.03 | 0.02 | 0.01 | 0.03 | 0.04 | 0.08 | 0.01 | 0.35 | 0.35 | |
| 4 | **Mean** | 74.80 | 0.07 | 13.07 | 1.60 | 0.07 | 0.05 | 0.72 | 4.09 | 5.07 | 0.34 | 99.81 | 0.19 | both sets |
| | **StDev** | 0.26 | 0.03 | 0.10 | 0.07 | 0.02 | 0.01 | 0.02 | 0.04 | 0.09 | 0.03 | 0.32 | 0.32 | |
| | **ID 3506** | **74.10** | **0.07** | **13.10** | **1.55** | **0.07** | **0.04** | **0.74** | **4.06** | **5.13** | **0.34** | **99.09** | | |
| | **Assay** | 0.96 | 0.03 | 0.34 | 0.06 | 0.03 | 0.02 | 0.05 | 0.28 | 0.26 | 0.03 | | | |
| 6 | **ID3506-1** | 73.72 | 0.06 | 13.34 | 1.54 | 0.1 | 0.04 | 0.7 | 4.1 | 5.24 | 0.33 | 100.00 | 0.83 | |
| | **ID3506-2** | 74.01 | 0.1 | 13.29 | 1.78 | 0.15 | 0.03 | 0.71 | 3.87 | 5.25 | 0.36 | 100.00 | 0.45 | |
| | **ID3506-3** | 72.03 | 0.07 | 13.16 | 1.63 | 0.03 | 0.04 | 0.71 | 4.12 | 5.1 | 0.31 | 100.00 | 2.8 | |
| | **ID3506-4** | 73.17 | 0.09 | 13.26 | 1.58 | 0.08 | 0.05 | 0.75 | 3.73 | 5.18 | 0.34 | 100.00 | 1.76 | |
| | **ID3506-5** | 72.74 | 0.05 | 13.2 | 1.65 | 0.15 | 0.01 | 0.69 | 3.99 | 4.99 | 0.38 | 100.00 | 2.15 | |
| | **ID3506-6** | 73.32 | 0.05 | 13.21 | 1.63 | 0.04 | 0.03 | 0.75 | 3.93 | 5.06 | 0.43 | 100.00 | 1.55 | |
| | **Mean** | 73.17 | 0.07 | 13.24 | 1.64 | 0.09 | 0.03 | 0.72 | 3.96 | 5.14 | 0.36 | 100.00 | 1.59 | 6 |
| | **StDev** | 0.71 | 0.02 | 0.07 | 0.08 | 0.05 | 0.01 | 0.03 | 0.15 | 0.10 | 0.04 | 0.00 | 0.86 | |
| | **ID 3506** | **74.10** | **0.07** | **13.10** | **1.55** | **0.07** | **0.04** | **0.74** | **4.06** | **5.13** | **0.34** | **99.09** | | |
| | **Assay** | 0.96 | 0.03 | 0.34 | 0.06 | 0.03 | 0.02 | 0.05 | 0.28 | 0.26 | 0.03 | | | |
| 6 | **ATho-1** | 73.35 | 0.24 | 12.09 | 3.18 | 0.1 | 0.07 | 1.59 | 4.62 | 2.75 | 0.07 | 100.00 | 1.94 | |
| | **ATho-2** | 73.2 | 0.25 | 12.05 | 3.14 | 0.02 | 0.08 | 1.67 | 4.34 | 2.69 | 0.06 | 100.00 | 2.51 | |
| | **ATho-3** | 73.73 | 0.24 | 11.9 | 3.28 | 0.14 | 0.11 | 1.64 | 4.62 | 2.78 | 0.05 | 100.00 | 1.5 | |
| | **ATho-4** | 74.25 | 0.29 | 12.16 | 3.4 | 0.08 | 0.1 | 1.65 | 4.13 | 2.71 | 0.08 | 100.00 | 1.14 | |
| | **ATho-5** | 74.37 | 0.18 | 12.28 | 3.29 | 0.09 | 0.05 | 1.68 | 4.07 | 2.73 | 0.07 | 100.00 | 1.17 | |
| | **ATho-6** | 74.91 | 0.24 | 12.18 | 3.33 | 0.07 | 0.06 | 1.67 | 3.91 | 2.76 | 0.06 | 100.00 | 0.82 | |
| | **ATho-7** | 74.36 | 0.27 | 12.31 | 3.41 | 0.08 | 0.1 | 1.72 | 4.12 | 2.71 | 0.03 | 100.00 | 0.9 | |
| | **ATho-8** | 73.38 | 0.25 | 11.89 | 3.4 | 0.21 | 0.12 | 1.65 | 4.33 | 2.75 | 0.03 | 100.00 | 1.99 | |
| | **Mean** | 73.94 | 0.25 | 12.11 | 3.30 | 0.10 | 0.09 | 1.66 | 4.27 | 2.74 | 0.06 | 100.00 | 1.50 | 8 |
| | **StDev** | 0.62 | 0.03 | 0.16 | 0.10 | 0.06 | 0.03 | 0.04 | 0.26 | 0.03 | 0.02 | 0.00 | 0.60 | |
| 1 | **UA 1119-36** | 71.46 | 0.00 | 15.14 | 2.25 | 0.02 | 0.55 | 2.10 | 4.78 | 3.16 | 0.54 | 100.00 | 0.88 | White River Ash eastern lobe Yukon reference |
| 1 | **UA 1119-7** | 71.56 | 0.23 | 15.68 | 1.71 | 0.03 | 0.28 | 2.35 | 4.31 | 3.48 | 0.38 | 100.00 | 2.08 | |
| 1 | **UA 1119-21** | 71.57 | 0.14 | 16.09 | 1.55 | 0.03 | 0.29 | 2.51 | 5.16 | 2.47 | 0.19 | 100.00 | 1.52 | |
| 1 | **UA 1119-4** | 71.87 | 0.29 | 15.88 | 1.94 | -0.05 | 0.48 | 1.72 | 4.61 | 2.87 | 0.41 | 100.00 | 4.44 | |
| 1 | **UA 1119-29** | 71.90 | 0.29 | 14.48 | 2.42 | 0.15 | 0.39 | 2.45 | 4.34 | 3.23 | 0.35 | 100.00 | 6.69 | |
| 1 | **UA 1119-25** | 72.43 | 0.24 | 14.60 | 2.25 | 0.14 | 0.23 | 2.14 | 4.15 | 3.36 | 0.47 | 100.00 | 4.63 | |
| 1 | **UA 1119-27** | 72.57 | 0.13 | 14.01 | 2.48 | 0.03 | 0.79 | 2.34 | 4.42 | 2.85 | 0.37 | 100.00 | 1.39 | |
| 1 | **UA 1119-35** | 72.61 | 0.17 | 13.51 | 1.96 | -0.15 | 0.75 | 2.37 | 4.58 | 3.93 | 0.27 | 100.00 | 0.89 | |
| 1 | **UA 1119-24** | 72.63 | 0.28 | 14.39 | 2.22 | -0.11 | 0.37 | 1.92 | 4.34 | 3.62 | 0.34 | 100.00 | 1.72 | |
| 1 | **UA 1119-12** | 72.74 | 0.20 | 14.46 | 2.04 | 0.20 | 0.19 | 1.99 | 4.85 | 2.93 | 0.41 | 100.00 | 1.95 | |
| 1 | **UA 1119-33** | 73.05 | 0.29 | 15.12 | 1.40 | 0.03 | 0.32 | 1.78 | 4.79 | 2.96 | 0.25 | 100.00 | 1.93 | |
| 1 | **UA 1119-38** | 73.19 | 0.23 | 14.12 | 1.27 | 0.16 | 0.41 | 2.55 | 4.60 | 3.08 | 0.39 | 100.00 | 3.48 | |
| 1 | **UA 1119-14** | 73.49 | 0.26 | 13.66 | 1.58 | 0.03 | 0.14 | 2.57 | 4.96 | 3.09 | 0.23 | 100.00 | 1.18 | |
| 1 | **UA 1119-13** | 73.53 | 0.42 | 13.65 | 1.73 | 0.10 | 0.23 | 1.91 | 4.59 | 3.58 | 0.27 | 100.00 | 3.06 | |
| 1 | **UA 1119-28** | 73.67 | 0.07 | 14.46 | 1.64 | -0.14 | 0.47 | 2.08 | 4.37 | 2.95 | 0.43 | 100.00 | 2.56 | |
| 1 | **UA 1119-11** | 73.78 | 0.35 | 13.96 | 1.36 | 0.04 | 0.84 | 1.70 | 4.34 | 3.24 | 0.39 | 100.00 | 2.31 | |
| 1 | **UA 1119-10** | 73.93 | 0.29 | 14.10 | 1.43 | 0.07 | 0.13 | 1.53 | 4.30 | 4.00 | 0.24 | 100.00 | 3.77 | |
| 1 | **UA 1119-20** | 73.94 | 0.30 | 13.71 | 1.90 | 0.14 | 0.26 | 1.79 | 4.95 | 2.69 | 0.32 | 100.00 | 2.93 | |
| 1 | **UA 1119-26** | 73.98 | 0.50 | 14.10 | 1.44 | 0.05 | 0.33 | 1.75 | 4.24 | 3.25 | 0.37 | 100.00 | 2.40 | |
| 1 | **UA 1119-15** | 73.99 | 0.25 | 14.20 | 1.63 | -0.05 | 0.43 | 1.64 | 4.27 | 3.38 | 0.26 | 100.00 | 1.27 | |
| 1 | **UA 1119-17** | 74.08 | 0.40 | 13.36 | 1.82 | -0.15 | 0.75 | 2.63 | 4.32 | 2.45 | 0.34 | 100.00 | 5.76 | |
| 1 | **UA 1119-8** | 74.14 | 0.12 | 13.46 | 2.08 | 0.09 | 0.25 | 1.60 | 4.54 | 3.48 | 0.24 | 100.00 | 2.50 | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **UA 1119-9** | 74.16 | 0.05 | 14.31 | 1.55 | -0.32 | 0.30 | 1.53 | 4.27 | 3.70 | 0.46 | 100.00 | 5.46 |
| 1 | **UA 1119-34** | 74.28 | 0.53 | 13.82 | 1.10 | 0.56 | 0.27 | 2.28 | 4.61 | 2.28 | 0.26 | 100.00 | 8.13 |
| 1 | **UA 1119-37** | 74.39 | 0.14 | 14.05 | 1.41 | -0.23 | 0.42 | 1.88 | 4.43 | 3.11 | 0.41 | 100.00 | 2.68 |
| 1 | **UA 1119-23** | 74.49 | 0.14 | 13.52 | 1.64 | -0.07 | 0.33 | 1.93 | 4.70 | 3.02 | 0.30 | 100.00 | 2.91 |
| 1 | **UA 1119-40** | 74.98 | 0.23 | 13.81 | 1.12 | -0.14 | 0.72 | 1.11 | 4.33 | 3.56 | 0.28 | 100.00 | 1.44 |
| 1 | **UA 1119-19** | 75.06 | 0.24 | 13.70 | 0.74 | -0.07 | 0.22 | 1.59 | 4.67 | 3.44 | 0.42 | 100.00 | 3.96 |
| 1 | **UA 1119-30** | 75.12 | 0.18 | 14.37 | 1.49 | -0.07 | 0.21 | 1.52 | 3.99 | 2.95 | 0.24 | 100.00 | 1.81 |
| 2 | **UA1119-6** | 71.28 | 0.24 | 15.40 | 1.85 | 0.10 | 0.31 | 2.26 | 4.56 | 3.66 | 0.35 | 100.00 | 1.05 |
| 2 | **UA1119-11** | 72.27 | 0.39 | 15.09 | 1.82 | 0.20 | 0.62 | 2.10 | 4.59 | 2.66 | 0.24 | 100.00 | 0.61 |
| 2 | **UA1119-4** | 72.49 | 0.38 | 15.13 | 1.53 | 0.20 | 0.41 | 1.61 | 4.42 | 3.36 | 0.47 | 100.00 | 3.97 |
| 2 | **UA1119-15** | 72.65 | 0.18 | 15.28 | 1.20 | 0.26 | 0.67 | 1.90 | 4.49 | 3.10 | 0.27 | 100.00 | 0.82 |
| 2 | **UA1119-22** | 72.67 | 0.07 | 14.92 | 1.96 | 0.03 | 0.39 | 1.81 | 4.80 | 3.01 | 0.34 | 100.00 | -0.14 |
| 2 | **UA1119-25** | 72.84 | -0.03 | 15.59 | 2.06 | -0.18 | 0.34 | 2.29 | 3.97 | 2.92 | 0.20 | 100.00 | 0.29 |
| 2 | **UA1119-2** | 73.04 | 0.12 | 14.58 | 1.32 | -0.03 | 0.86 | 2.27 | 4.47 | 3.06 | 0.31 | 100.00 | 4.78 |
| 2 | **UA1119-17** | 73.12 | 0.02 | 15.37 | 1.40 | 0.04 | 0.25 | 2.10 | 4.18 | 3.18 | 0.33 | 100.00 | -0.59 |
| 2 | **UA1119-7** | 73.23 | 0.27 | 14.50 | 1.75 | -0.03 | 0.70 | 1.68 | 4.29 | 3.30 | 0.31 | 100.00 | 4.92 |
| 2 | **UA1119-24** | 73.27 | 0.06 | 14.03 | 2.03 | -0.11 | 0.47 | 1.93 | 4.37 | 3.64 | 0.32 | 100.00 | 3.02 |
| 2 | **UA1119-31** | 73.32 | 0.18 | 14.66 | 1.66 | 0.25 | 0.25 | 1.67 | 4.10 | 3.45 | 0.46 | 100.00 | 2.62 |
| 2 | **UA1119-3** | 73.39 | 0.11 | 14.85 | 1.26 | 0.06 | 0.74 | 1.51 | 4.41 | 3.24 | 0.43 | 100.00 | 6.50 |
| 2 | **UA1119-29** | 73.76 | 0.08 | 14.54 | 1.26 | 0.26 | 0.11 | 1.88 | 3.95 | 3.80 | 0.36 | 100.00 | 3.79 |
| 2 | **UA1119-23** | 74.04 | 0.08 | 14.14 | 1.49 | 0.12 | 0.37 | 1.74 | 4.55 | 2.99 | 0.48 | 100.00 | 2.24 |
| 2 | **UA1119-9** | 74.07 | 0.15 | 13.65 | 1.64 | 0.34 | 0.21 | 1.63 | 4.17 | 3.74 | 0.38 | 100.00 | 3.12 |
| 2 | **UA1119-1** | 74.37 | 0.32 | 13.62 | 1.53 | 0.21 | 0.11 | 2.17 | 4.11 | 3.20 | 0.36 | 100.00 | 5.29 |
| 2 | **UA1119-16** | 74.43 | 0.02 | 13.83 | 1.30 | 0.55 | 0.00 | 1.59 | 4.22 | 3.78 | 0.30 | 100.00 | 2.03 |
| 2 | **UA1119-27** | 74.49 | 0.40 | 14.19 | 1.01 | 0.24 | 0.27 | 1.44 | 4.23 | 3.09 | 0.63 | 100.00 | 2.53 |
| 2 | **UA1119-13** | 74.56 | -0.03 | 14.54 | 1.30 | -0.04 | 0.07 | 1.66 | 4.27 | 3.41 | 0.26 | 100.00 | 1.78 |
| 2 | **UA1119-5** | 74.57 | 0.20 | 13.20 | 1.46 | 0.74 | 0.06 | 1.71 | 4.41 | 3.41 | 0.24 | 100.00 | 7.28 |
| 2 | **UA1119-8** | 74.77 | 0.15 | 13.39 | 1.44 | 0.08 | 0.14 | 1.85 | 4.06 | 3.78 | 0.33 | 100.00 | 3.34 |
| 2 | **UA1119-20** | 74.88 | 0.18 | 13.57 | 1.42 | 0.36 | 0.45 | 1.83 | 4.33 | 2.70 | 0.28 | 100.00 | 3.16 |
| 2 | **UA1119-14** | 74.90 | 0.00 | 13.89 | 1.50 | 0.17 | 0.11 | 1.60 | 3.45 | 4.05 | 0.32 | 100.00 | 2.68 |
| 2 | **UA1119-30** | 74.91 | 0.00 | 14.62 | 1.47 | -0.15 | 0.14 | 1.62 | 4.06 | 2.97 | 0.35 | 100.00 | 3.89 |
| 2 | **UA1119-19** | 74.97 | -0.11 | 14.18 | 1.13 | -0.24 | 0.53 | 2.19 | 4.12 | 2.92 | 0.33 | 100.00 | 5.47 |
| 2 | **UA1119-21** | 75.49 | 0.10 | 14.29 | 1.32 | 0.20 | 0.28 | 1.86 | 3.52 | 2.70 | 0.23 | 100.00 | 5.56 |
| 3 | **UA 1119-1** | 75.12 | 0.07 | 13.09 | 2.06 | -0.17 | 0.36 | 1.74 | 4.41 | 3.06 | 0.26 | 100.00 | 3.62 |
| 3 | **UA 1119-2** | 72.80 | 0.12 | 14.84 | 1.32 | 0.10 | 0.21 | 2.05 | 4.05 | 4.02 | 0.50 | 100.00 | -0.15 |
| 3 | **UA 1119-3** | 73.54 | 0.35 | 13.33 | 1.68 | 0.08 | 1.38 | 2.35 | 4.08 | 2.88 | 0.34 | 100.00 | 4.19 |
| 3 | **UA 1119-4** | 74.66 | 0.15 | 14.65 | 1.93 | -0.25 | 0.34 | 1.84 | 3.43 | 2.85 | 0.40 | 100.00 | 2.57 |
| 3 | **UA 1119-5** | 74.32 | 0.15 | 13.41 | 1.87 | -0.05 | 0.27 | 1.87 | 4.19 | 3.64 | 0.32 | 100.00 | 2.25 |
| 3 | **UA 1119-6** | 72.66 | 0.11 | 14.88 | 1.55 | 0.85 | 0.73 | 1.62 | 4.37 | 2.80 | 0.42 | 100.00 | 1.34 |
| 3 | **UA 1119-7** | 73.57 | 0.00 | 14.77 | 1.23 | -0.05 | 0.52 | 2.08 | 4.25 | 3.35 | 0.29 | 100.00 | 1.38 |
| 4 | **UA 1119-22** | 72.96 | 0.27 | 15.11 | 1.60 | 0.01 | 0.38 | 2.22 | 4.29 | 2.90 | 0.25 | 100.00 | 3.12 |
| 4 | **UA 1119-19** | 73.36 | 0.29 | 14.60 | 1.70 | 0.03 | 0.37 | 1.98 | 4.21 | 3.13 | 0.32 | 100.00 | 6.27 |
| 4 | **UA 1119-11** | 73.38 | 0.21 | 14.41 | 1.76 | 0.07 | 0.37 | 2.03 | 4.29 | 3.12 | 0.36 | 100.00 | 1.24 |
| 4 | **UA 1119-12** | 73.39 | 0.26 | 14.62 | 1.91 | 0.10 | 0.37 | 2.05 | 3.94 | 2.96 | 0.39 | 100.00 | 1.87 |
| 4 | **UA 1119-26** | 73.52 | 0.20 | 14.41 | 1.66 | 0.07 | 0.39 | 2.03 | 4.30 | 3.03 | 0.40 | 100.00 | 2.47 |
| 4 | **UA 1119-2** | 73.55 | 0.24 | 14.55 | 1.62 | 0.01 | 0.42 | 1.95 | 4.07 | 3.26 | 0.33 | 100.00 | 3.50 |
| 4 | **UA 1119-17** | 73.56 | 0.28 | 14.26 | 1.59 | 0.03 | 0.38 | 2.06 | 4.49 | 2.99 | 0.36 | 100.00 | 2.69 |
| 4 | **UA 1119-9** | 73.58 | 0.28 | 14.60 | 1.52 | 0.08 | 0.39 | 1.86 | 4.22 | 3.13 | 0.33 | 100.00 | 3.00 |
| 4 | **UA 1119-16** | 73.67 | 0.17 | 14.42 | 1.53 | 0.06 | 0.38 | 1.95 | 4.17 | 3.27 | 0.36 | 100.00 | 1.70 |
| 4 | **UA 1119-7** | 73.69 | 0.17 | 14.54 | 1.57 | 0.03 | 0.41 | 1.99 | 4.17 | 3.11 | 0.33 | 100.00 | 3.14 |
| 4 | **UA 1119-14** | 73.74 | 0.20 | 14.65 | 1.39 | 0.06 | 0.24 | 1.87 | 4.37 | 3.17 | 0.30 | 100.00 | 2.35 |
| 4 | **UA 1119-13** | 73.94 | 0.21 | 14.32 | 1.53 | 0.03 | 0.46 | 1.81 | 4.21 | 3.16 | 0.33 | 100.00 | 2.30 |
| 4 | **UA 1119-3** | 74.23 | 0.32 | 14.35 | 1.50 | 0.05 | 0.31 | 1.85 | 3.66 | 3.39 | 0.34 | 100.00 | 2.77 |
| 4 | **UA 1119-24** | 74.35 | 0.16 | 14.21 | 1.47 | 0.04 | 0.24 | 1.66 | 4.21 | 3.33 | 0.32 | 100.00 | 3.57 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | **UA 1119-25** | 74.41 | 0.20 | 14.11 | 1.41 | 0.07 | 0.31 | 1.67 | 4.20 | 3.31 | 0.31 | 100.00 | 3.79 | |
| 4 | **UA 1119-6** | 74.49 | 0.22 | 14.24 | 1.27 | 0.01 | 0.32 | 1.59 | 4.19 | 3.36 | 0.31 | 100.00 | 1.95 | |
| 4 | **UA 1119-5** | 75.31 | 0.16 | 13.79 | 1.20 | 0.04 | 0.23 | 1.54 | 4.00 | 3.43 | 0.31 | 100.00 | 3.33 | |
| 5 | **UA 1119-1** | 73.80 | 0.19 | 13.97 | 1.54 | 0.05 | 0.38 | 1.85 | 4.83 | 3.34 | | 100 | | |
| 5 | **UA 1119-2** | 74.24 | 0.15 | 14.42 | 1.31 | 0.06 | 0.29 | 1.60 | 4.47 | 3.40 | | 100 | | |
| 5 | **UA 1119-3** | 73.52 | 0.21 | 14.78 | 1.36 | 0.04 | 0.39 | 1.93 | 4.24 | 3.48 | | 100 | | |
| | **Mean** | 73.66 | 0.19 | 14.34 | 1.59 | 0.07 | 0.38 | 1.90 | 4.32 | 3.22 | 0.34 | 100.00 | 2.91 | 79 |
| | **StDev** | 0.95 | 0.12 | 0.63 | 0.32 | 0.19 | 0.22 | 0.30 | 0.31 | 0.36 | 0.08 | 0.00 | 1.73 | |
| | | | | | | | | | | | | | | |
| 1 | **NGRIP-1** | 72.60 | 0.32 | 14.82 | 1.82 | 0.04 | 0.22 | 2.04 | 4.51 | 3.30 | 0.33 | 100.00 | 4.69 | NGRIP |
| 1 | **NGRIP-2** | 73.66 | 0.38 | 14.18 | 1.45 | -0.08 | 0.42 | 2.05 | 4.14 | 3.22 | 0.59 | 100.00 | 9.52 | Greenland |
| 1 | **NGRIP-3** | 73.76 | 0.02 | 13.90 | 1.21 | -0.09 | 0.18 | 2.27 | 4.38 | 4.05 | 0.31 | 100.00 | 4.68 | |
| 1 | **NGRIP-4** | 74.25 | 0.24 | 13.65 | 1.11 | 0.26 | 0.31 | 2.26 | 4.88 | 2.73 | 0.32 | 100.00 | 4.63 | |
| 1 | **NGRIP-5** | 74.66 | 0.25 | 13.73 | 1.06 | 0.08 | 0.37 | 2.02 | 4.27 | 3.24 | 0.32 | 100.00 | 0.00 | |
| 1 | **NGRIP-6** | 74.83 | 0.10 | 14.13 | 1.48 | -0.24 | 0.44 | 1.51 | 4.31 | 3.13 | 0.30 | 100.00 | 1.54 | |
| 1 | **NGRIP-7** | 75.93 | 0.13 | 13.14 | 0.98 | -0.13 | 0.05 | 1.27 | 4.78 | 3.38 | 0.46 | 100.00 | -0.05 | |
| | **Mean** | 74.24 | 0.21 | 13.94 | 1.30 | -0.02 | 0.28 | 1.92 | 4.47 | 3.29 | 0.38 | 100.00 | 3.57 | 7 |
| | **StDev** | 1.05 | 0.12 | 0.52 | 0.30 | 0.16 | 0.14 | 0.38 | 0.27 | 0.40 | 0.11 | 0.00 | 3.39 | |
| | | | | | | | | | | | | | | |
| 2 | **QUB108-1** | 73.28 | 0.23 | 14.62 | 1.38 | -0.07 | 0.42 | 2.19 | 4.83 | 2.83 | 0.31 | 100.00 | 4.11 | Sluggan Bog |
| 2 | **QUB108-2** | 73.43 | 0.37 | 14.86 | 1.18 | -0.31 | 0.68 | 1.87 | 3.89 | 3.66 | 0.37 | 100.00 | 5.28 | Northern |
| 2 | **QUB108-3** | 74.40 | 0.10 | 14.21 | 1.17 | -0.03 | 0.42 | 2.31 | 4.32 | 2.82 | 0.28 | 100.00 | 5.66 | Ireland |
| 2 | **QUB108-4** | 75.30 | 0.18 | 13.72 | 1.10 | -0.17 | 0.66 | 1.92 | 4.00 | 3.00 | 0.30 | 100.00 | 3.47 | |
| 3 | **QUB108-5** | 74.90 | 0.16 | 14.07 | 1.81 | 0.04 | 0.46 | 1.75 | 3.94 | 2.62 | 0.25 | 100.00 | 2.35 | |
| 3 | **QUB108-6** | 75.72 | 0.26 | 14.11 | 1.59 | -0.26 | 0.16 | 1.61 | 3.60 | 2.85 | 0.37 | 100.00 | 5.36 | |
| | **Mean** | 74.50 | 0.22 | 14.26 | 1.37 | -0.13 | 0.47 | 1.94 | 4.10 | 2.96 | 0.31 | 100.00 | 4.37 | 6 |
| | **StDev** | 0.99 | 0.09 | 0.41 | 0.28 | 0.14 | 0.19 | 0.27 | 0.43 | 0.36 | 0.05 | 0.00 | 1.30 | |
| | | | | | | | | | | | | | | |
| 4 | **DOM-26** | 71.49 | 0.33 | 15.02 | 2.05 | 0.11 | 0.88 | 2.68 | 4.20 | 3.01 | 0.23 | 100.00 | 1.29 | Germany |
| 4 | **DOM-27** | 72.03 | 0.33 | 14.79 | 2.10 | 0.07 | 0.69 | 2.44 | 3.89 | 3.09 | 0.55 | 100.00 | 6.17 | |
| 4 | **DOM-6** | 73.67 | 0.20 | 14.54 | 1.59 | 0.06 | 0.37 | 1.91 | 4.26 | 3.07 | 0.32 | 100.00 | 1.94 | |
| 4 | **DOM-34** | 73.70 | 0.28 | 14.48 | 1.53 | 0.04 | 0.42 | 1.96 | 4.10 | 3.05 | 0.45 | 100.00 | 2.27 | |
| 4 | **DOM-5** | 73.84 | 0.23 | 14.25 | 1.54 | 0.05 | 0.41 | 1.95 | 4.12 | 3.16 | 0.45 | 100.00 | 6.21 | |
| 4 | **DOM-23** | 74.15 | 0.25 | 14.17 | 1.37 | 0.06 | 0.35 | 1.74 | 4.26 | 3.27 | 0.38 | 100.00 | 3.61 | |
| | **Mean** | 73.15 | 0.27 | 14.54 | 1.70 | 0.07 | 0.52 | 2.11 | 4.14 | 3.11 | 0.40 | 100.00 | 3.58 | 6 |
| | **StDev** | 1.10 | 0.05 | 0.32 | 0.30 | 0.02 | 0.22 | 0.36 | 0.14 | 0.09 | 0.11 | 0.00 | 2.16 | |
| | | | | | | | | | | | | | | |
| 4 | **JAM-33** | 73.55 | 0.20 | 14.62 | 1.51 | 0.07 | 0.42 | 1.90 | 4.32 | 3.04 | 0.36 | 100.00 | 1.11 | Germany |
| 4 | **JAM-3** | 73.59 | 0.22 | 14.34 | 1.60 | 0.06 | 0.48 | 2.03 | 4.10 | 3.11 | 0.46 | 100.00 | 4.54 | |
| 4 | **JAM-27** | 73.66 | 0.21 | 14.55 | 1.55 | 0.08 | 0.37 | 1.95 | 4.20 | 3.03 | 0.40 | 100.00 | 1.94 | |
| 4 | **JAM-9** | 73.70 | 0.22 | 14.33 | 1.38 | 0.03 | 0.41 | 1.86 | 4.59 | 3.17 | 0.31 | 100.00 | 3.42 | |
| 4 | **JAM-14** | 73.74 | 0.21 | 14.55 | 1.62 | 0.04 | 0.37 | 1.92 | 4.08 | 3.09 | 0.38 | 100.00 | 3.38 | |
| 4 | **JAM-34** | 73.79 | 0.19 | 14.43 | 1.55 | 0.09 | 0.36 | 1.92 | 4.25 | 3.06 | 0.37 | 100.00 | 1.09 | |
| 4 | **JAM-10** | 74.19 | 0.19 | 14.13 | 1.56 | 0.09 | 0.42 | 1.89 | 3.97 | 3.03 | 0.51 | 100.00 | 5.72 | |
| | **Mean** | 73.75 | 0.21 | 14.42 | 1.54 | 0.06 | 0.40 | 1.92 | 4.22 | 3.08 | 0.40 | 100.00 | 3.03 | 7 |
| | **StDev** | 0.21 | 0.01 | 0.17 | 0.08 | 0.02 | 0.04 | 0.05 | 0.20 | 0.05 | 0.07 | 0.00 | 1.75 | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | P2O5 | | | |
| 5 | **Petite-1** | 75.24 | 0.19 | 13.20 | 1.35 | 0.07 | 0.40 | 1.87 | 4.32 | 3.29 | 0.07 | 100.00 | 2.70 | Nova Scotia, Canada Analysed in Edinburgh |
| 5 | **Petite-2** | 75.14 | 0.20 | 13.57 | 1.54 | 0.05 | 0.36 | 1.86 | 3.87 | 3.39 | 0.05 | 100.00 | 1.89 | |
| 5 | **Petite-3** | 73.97 | 0.19 | 14.50 | 1.46 | 0.06 | 0.31 | 1.65 | 4.55 | 3.27 | 0.05 | 100.00 | 3.39 | |
| 5 | **Petite-4** | 73.78 | 0.16 | 14.99 | 1.48 | 0.02 | 0.41 | 1.85 | 4.13 | 3.11 | 0.06 | 100.00 | 2.62 | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | **Petite-5** | 75.15 | 0.14 | 14.00 | 1.14 | 0.04 | 0.25 | 1.56 | 4.29 | 3.40 | 0.02 | 100.00 | 2.10 | |
| 5 | **Petite-6** | 73.89 | 0.15 | 15.34 | 1.47 | 0.04 | 0.39 | 1.61 | 4.11 | 2.93 | 0.05 | 100.00 | 3.71 | |
| 5 | **Petite-7** | 74.41 | 0.18 | 14.01 | 1.39 | 0.04 | 0.35 | 1.79 | 4.36 | 3.41 | 0.05 | 100.00 | 2.86 | |
| | **Mean** | 74.51 | 0.17 | 14.23 | 1.40 | 0.05 | 0.35 | 1.74 | 4.23 | 3.26 | 0.05 | 100.00 | 2.75 | 7 |
| | **StDev** | 0.65 | 0.02 | 0.76 | 0.13 | 0.01 | 0.06 | 0.13 | 0.22 | 0.18 | 0.02 | 0.00 | 0.65 | |
| | | | | | | | | | | | | | | |
| 6 | **Neem-1** | 73.63 | 0.27 | 14.70 | 1.66 | 0.08 | 0.37 | 2.04 | 4.09 | 3.19 | NM | 100.00 | 7.25 | NEEM |
| 6 | **Neem-2** | 73.97 | 0.20 | 14.46 | 1.50 | 0.08 | 0.35 | 1.81 | 4.35 | 3.28 | NM | 100.00 | 6.74 | Greenland |
| 6 | **Neem-3** | 75.38 | 0.11 | 14.15 | 1.43 | -0.01 | 0.25 | 1.76 | 3.00 | 3.45 | 0.48 | 100.00 | 5.61 | Analysed in Belfast |
| 6 | **Neem-4** | 75.35 | 0.19 | 14.28 | 1.35 | 0.03 | 0.29 | 1.65 | 3.09 | 3.39 | 0.39 | 100.00 | 4.88 | |
| 6 | **Neem-5** | 75.00 | 0.15 | 14.00 | 1.30 | -0.04 | 0.19 | 1.59 | 3.73 | 3.68 | 0.43 | 100.00 | 3.72 | |
| 6 | **Neem-6** | 74.61 | 0.14 | 14.30 | 1.47 | -0.03 | 0.24 | 1.65 | 3.78 | 3.45 | 0.39 | 100.00 | -1.58 | |
| 6 | **Neem-7** | 74.30 | 0.19 | 14.37 | 1.28 | 0.12 | 0.26 | 1.67 | 4.04 | 3.35 | 0.42 | 100.00 | 0.07 | |
| 6 | **Neem-8** | 74.23 | 0.21 | 14.43 | 1.41 | 0.01 | 0.34 | 1.84 | 3.81 | 3.30 | 0.43 | 100.00 | 1.61 | |
| 6 | **Neem-9** | 73.65 | 0.22 | 14.57 | 1.45 | 0.06 | 0.33 | 1.97 | 4.15 | 3.19 | 0.41 | 100.00 | -1.15 | |
| 6 | **Neem-10** | 73.49 | 0.26 | 14.84 | 1.54 | 0.09 | 0.35 | 1.92 | 3.96 | 3.22 | 0.33 | 100.00 | -2.13 | |
| 6 | **Neem-11** | 73.49 | 0.24 | 14.75 | 1.66 | 0.07 | 0.37 | 1.88 | 3.93 | 3.24 | 0.38 | 100.00 | 1.94 | |
| 6 | **Neem-12** | 73.34 | 0.29 | 14.52 | 1.77 | 0.05 | 0.43 | 1.96 | 3.92 | 3.26 | 0.46 | 100.00 | 7.18 | |
| 6 | **Neem-13** | 73.27 | 0.26 | 14.77 | 1.65 | 0.05 | 0.45 | 1.92 | 3.96 | 3.31 | 0.35 | 100.00 | 0.49 | |
| 6 | **Neem-14** | 73.24 | 0.18 | 14.94 | 1.71 | -0.03 | 0.40 | 1.95 | 4.01 | 3.16 | 0.45 | 100.00 | 1.61 | |
| | **Mean** | 74.07 | 0.21 | 14.51 | 1.51 | 0.04 | 0.33 | 1.83 | 3.84 | 3.32 | 0.41 | 100.00 | 2.59 | 14 |
| | **StDev** | 0.76 | 0.05 | 0.27 | 0.16 | 0.05 | 0.08 | 0.14 | 0.37 | 0.14 | 0.04 | 0.00 | 3.31 | |

* Analyses in red have totals < 95 wt%, >90 wt%. For samples of Holocene age it is not uncommon to remove analyses with totals < 95 wt % since hydration is not often high enough to cause such low total, However, these samples consistently plot with the main population on all oxides.
NEEM = NEEM_2011_S1.

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