

Table S1a: Step-degassing Ne analyses of CRONUS-A quartz standard run during period of sample measurements.

| Sample name | Aliquot | Aliquot weight (g) | Heating temperature (deg C) | Heating time (hr) | Total ^{20}Ne released ¹ (10^9 atoms) | Total ^{21}Ne released ² (10^9 atoms) | Total ^{22}Ne released ³ (10^9 atoms) | $^{21}\text{Ne} / ^{20}\text{Ne}^4$ (10^3) | $^{22}\text{Ne} / ^{20}\text{Ne}^4$ (10^3) | Cosmogenic $^{21}\text{Ne}^5$ This heating step (10^9 atoms g^{-1}) | Cosmogenic ^{21}Ne as % of ^{21}Ne released in this heating step | Percent of total cosmogenic ^{21}Ne released in this step | Total cosmogenic ^{21}Ne (10^9 atoms g^{-1}) |
|-------------|---------|--------------------|-----------------------------|-------------------|--|--|--|--|--|--|--|--|--|
| CRONUS-A | b | 0.1537 | 400 | 0.25 | 0.380 +/- 0.028 | 21.891 +/- 0.471 | 60.745 +/- 2.741 | 57.439 +/- 4.291 | 162.0 +/- 13.8 | 135.61 +/- 3.13 | 95 | 41 | 332.2 +/- 5.1 |
| | | | 850 | 0.25 | 2.132 +/- 0.038 | 35.628 +/- 0.594 | 248.924 +/- 3.766 | 16.649 +/- 0.288 | 118.1 +/- 2.4 | 191.46 +/- 3.95 | 83 | 58 | |
| | | | 1100 | 0.25 | 0.179 +/- 0.024 | 1.316 +/- 0.093 | 14.813 +/- 2.301 | 7.338 +/- 1.114 | 83.8 +/- 17.2 | 5.16 +/- 0.77 | 60 | 2 | |
| CRONUS-A | c | 0.164 | 400 | 0.25 | 0.760 +/- 0.033 | 23.694 +/- 0.484 | 97.014 +/- 2.677 | 31.197 +/- 1.385 | 129.5 +/- 6.4 | 131.26 +/- 3.02 | 91 | 39 | 335.8 +/- 5.1 |
| | | | 850 | 0.25 | 2.196 +/- 0.040 | 39.028 +/- 0.639 | 252.650 +/- 3.163 | 17.732 +/- 0.309 | 116.5 +/- 2.2 | 199.10 +/- 3.98 | 84 | 59 | |
| | | | 1100 | 0.25 | 0.164 +/- 0.027 | 1.367 +/- 0.104 | 17.426 +/- 2.268 | 8.316 +/- 1.480 | 107.6 +/- 22.3 | 5.40 +/- 0.79 | 65 | 2 | |
| CRONUS-A | d | 0.1384 | 400 | 0.25 | 1.051 +/- 0.037 | 18.147 +/- 0.401 | 119.584 +/- 3.767 | 17.158 +/- 0.632 | 114.4 +/- 5.0 | 109.05 +/- 3.01 | 83 | 33 | 328.7 +/- 5.8 |
| | | | 850 | 0.25 | 1.887 +/- 0.037 | 34.563 +/- 0.657 | 218.786 +/- 4.386 | 18.228 +/- 0.358 | 116.8 +/- 2.6 | 210.18 +/- 4.83 | 84 | 64 | |
| | | | 1100 | 0.25 | 0.223 +/- 0.022 | 1.971 +/- 0.12 | 23.990 +/- 2.662 | 8.852 +/- 0.997 | 108.7 +/- 15.9 | 9.51 +/- 0.98 | 67 | 3 | |
| CRONUS-A | e | 0.1562 | 400 | 0.25 | 0.478 +/- 0.028 | 17.880 +/- 0.495 | 65.161 +/- 3.594 | 37.962 +/- 2.219 | 137.6 +/- 10.6 | 105.80 +/- 3.22 | 92 | 32 | 330.9 +/- 6.5 |
| | | | 850 | 0.25 | 2.199 +/- 0.045 | 40.225 +/- 0.867 | 256.776 +/- 4.714 | 18.648 +/- 0.334 | 118.1 +/- 2.2 | 216.66 +/- 5.64 | 84 | 65 | |
| | | | 1100 | 0.25 | 0.216 +/- 0.017 | 1.952 +/- 0.098 | 20.333 +/- 2.234 | 9.167 +/- 0.839 | 95.0 +/- 12.8 | 8.43 +/- 0.71 | 67 | 3 | |
| CRONUS-A | f | 0.1166 | 400 | 0.25 | 0.450 +/- 0.034 | 15.637 +/- 0.39 | 60.895 +/- 3.408 | 35.346 +/- 2.610 | 136.2 +/- 12.2 | 123.16 +/- 3.47 | 92 | 36 | 339.6 +/- 6.7 |
| | | | 850 | 0.25 | 1.642 +/- 0.042 | 29.028 +/- 0.645 | 195.483 +/- 5.452 | 17.863 +/- 0.275 | 119.7 +/- 2.6 | 208.06 +/- 5.65 | 84 | 61 | |
| | | | 1100 | 0.25 | 0.170 +/- 0.020 | 1.480 +/- 0.104 | 20.023 +/- 2.969 | 8.785 +/- 1.157 | 118.5 +/- 21.9 | 8.41 +/- 1.03 | 66 | 2 | |
| CRONUS-A | g | 0.1424 | 400 | 0.25 | 0.597 +/- 0.035 | 15.376 +/- 0.362 | 73.062 +/- 3.829 | 26.206 +/- 1.529 | 122.9 +/- 9.4 | 95.92 +/- 2.65 | 89 | 29 | 331.6 +/- 7.4 |
| | | | 850 | 0.25 | 2.001 +/- 0.044 | 37.708 +/- 0.954 | 233.712 +/- 6.351 | 18.941 +/- 0.398 | 117.5 +/- 3.7 | 224.05 +/- 6.79 | 85 | 68 | |
| | | | 1100 | 0.25 | 0.250 +/- 0.026 | 2.396 +/- 0.135 | 26.011 +/- 2.829 | 9.626 +/- 1.098 | 104.2 +/- 15.4 | 11.67 +/- 1.09 | 69 | 4 | |
| CRONUS-A | h | 0.1813 | 400 | 0.25 | 0.590 +/- 0.026 | 30.133 +/- 0.544 | 88.676 +/- 4.372 | 53.114 +/- 2.388 | 154.1 +/- 10.0 | 157.32 +/- 3.04 | 95 | 47 | 332.1 +/- 4.9 |
| | | | 850 | 0.25 | 2.473 +/- 0.042 | 37.968 +/- 0.67 | 277.440 +/- 8.206 | 15.771 +/- 0.299 | 113.2 +/- 3.7 | 169.68 +/- 3.77 | 81 | 51 | |
| | | | 1100 | 0.25 | 0.182 +/- 0.023 | 1.465 +/- 0.082 | 18.238 +/- 2.942 | 8.183 +/- 1.112 | 99.8 +/- 20.3 | 5.12 +/- 0.59 | 63 | 2 | |
| CRONUS-A | i | 0.1218 | 400 | 0.25 | 0.502 +/- 0.026 | 17.278 +/- 0.387 | 60.453 +/- 4.135 | 35.120 +/- 1.886 | 121.2 +/- 10.3 | 130.14 +/- 3.25 | 92 | 39 | 333.2 +/- 6.0 |
| | | | 850 | 0.25 | 1.715 +/- 0.033 | 28.945 +/- 0.591 | 195.119 +/- 5.771 | 17.155 +/- 0.395 | 114.8 +/- 3.9 | 196.71 +/- 4.94 | 83 | 59 | |
| | | | 1100 | 0.25 | 0.142 +/- 0.024 | 1.189 +/- 0.074 | 14.477 +/- 2.796 | 8.516 +/- 1.540 | 101.6 +/- 26.2 | 6.33 +/- 0.85 | 65 | 2 | |

¹ Computed by comparison to ^{20}Ne signal in air pipettes. 1-sigma uncertainty includes measurement uncertainty of ^{20}Ne signal in this analysis and the reproducibility of the air pipette signal

² Computed by comparison to ^{21}Ne signal in air pipettes. 1-sigma uncertainty includes measurement uncertainty of ^{21}Ne signal in this analysis and the reproducibility of the air pipette signal

³ Computed by comparison to ^{22}Ne signal in air pipettes. 1-sigma uncertainty includes measurement uncertainty of ^{22}Ne signal in this analysis and the reproducibility of the air pipette signal

⁴ Isotope ratio measured internally during each analysis; does not involve normalization to the Ne isotope signals in the air pipettes.

⁵ Computed by comparison of ^{20}Ne or ^{22}Ne signal to air pipettes, whichever is more precise. Assumes that Ne in sample is a binary mixture of atmospheric and cosmogenic Ne.