**Table DR1**: Origin and description of early-Archean chert samples from the Pilbara Craton, Western Australia.

| Formation | Sampled unit | Age (Ma) | Sample code* | Location/type | Description | Accessory minerals† | References$ |
|---|---|---|---|---|---|---|---|
| Towers Formation | Marble Bar chert | ~3460 | MB-04-B* | S: 21°12.091' E: 119°43.346' 67m above base stratiform chert (C-chert) | Black-white banded chert. Locally layering is brecciated and translucent to milky-white chert fragments float in black/gray fine grained chert matrix | *Black*: abundant Fe(oxi)hydroxide (goethite), some hematite, rare Cu and (As,Zn) sulphide | 1, 2, 3, 4 |
| | | | MB-04-W* | | | *White*: few Fe(oxide)hydroxide (goethite) | |
| | | | MB-09-W1 | S: 21°12.091' E:119°43.346' Base stratiform chert (C-chert) | Regularly banded red-white/gray chert. Translucent quartz veins intersect banding at high angles | *White/gray*: few Fe(oxi)hydroxide, (Fe,Mg) silicate, carbon clots | |
| | | | MB-09-R1* | | | *Red*: abundant hematite, goethite and other Fe(oxi)hydroxide | |
| Apex Formation | Apex chert | Between ~3460 and ~3454 | APC-FB1-W1* | S: 21°11'22.9" E: 119°42'15.1" Feeder dike 150m below stratiform chert (C-chert) | Fine grained, (dark) gray chert with 'halos' of glassy to translucent white chert | *White halos*: no disseminated minerals | 1, 4, 5, 6, 7, 8, 9 |
| | | | APC-FB1-G1* | | | *Gray*: few small Fe(oxide)hydroxide (goethite), rare monazite | |
| | | | APC-B1 | S: 21°11'16.3" E: 119°42'08.3" Middle stratiform chert (S-chert) | Fine grained, light to dark gray chert | Abundant clots and/or lath-shaped sericite, some Fe(oxi)hydroxide, barite, alunite, Ti oxide, pyrite and carbon clots | |
| Dresser Formation | North Pole chert-barite unit | ~3490 | NP-FC8 | S:21°05'58.5" E: 119°26'28.1" Feeder dike just below stratiform chert (C-chert) | Massive black chert | Abundant pyrite, chalcopyrite and covellite, few carbonate (with various Mg, Ca, Fe and Mn contents), apatite and Ba-silicate | 4, 10, 11, 12, 13, 14 |
| | | | NP-FC9 | S: 21°05'58.5" E: 119°26'28.1" Feeder dike just below stratiform chert (S-chert) | Fine grained, gray chert intersected by few small white quartz veins | Irregular patches of sericite and some goethite, Ti oxide, (Si,Al,K) sulphate, carbon clots and rare barite | |
| | | | NP-CU5 | S: 21°05'58.5" E:119°26'28.1" Top stratiform chert (groundmass: C-chert) | Silicified well rounded, greenish, heterolithic coarse sand grains in translucent chert matrix | Grains outlined by patches of (Fe,Mg) silicate, grain interiors filled with either quartz or (Fe,Mg) silicate. Quartz veins contain large Fe-hydroxide and zoned (Ca,Mg,Fe) carbonate | |
| Panorama Formation | Kitty's Gap volcano-sedimentary unit | ~3450 | L1-13.3b-W1* | S: 20°53'35.3" E: 120°04'24.5" 13.3m above base stratiform chert (S-chert) | Alternation of coarse grained white bands and fine grained gray and black bands (with wrinkly laminations). Sedimentary structures include ripples, flaser linsen and undulating laminations | *White*: abundant large sericite that seem to have replaced aggregates of lath shaped minerals or volcanic fragments with spinifex textures, also small Ti oxide, few monazite, rare zircon and (Cu,Zn) oxide | 4, 15, 16 |
| | | | L1-13.3b-B1* | | | *Black*: abundant sericite without clear shape and small Ti oxide, few monazite, rare zircon, (Cu,Zn) oxide and carbon clots (?) | |
| | | | L1-13.3b-G1* | | | *Gray*: abundant sericite without clear shape and small Ti oxide, few monazite, rare zircon and (Cu,Zn) oxide | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | L1-13.3b-B2* | | | *Black*: abundant sericite without clear shape and small Ti oxide, few monazite, rare zircon, (Cu,Zn) oxide and carbon clots (?) | |
| | | | L1-73b-G1* | S: 20°53'35.3"<br>E: 120°04'24.5"<br>73m above base stratiform chert (S-chert) | Fragmented/brecciated dark green chert clasts in very fine grained gray-greenish chert matrix | *Gray-greenish groundmass*: few tiny Ti oxide and (Cr,Fe) oxide and irregular sericite patches | |
| | | | L1-73b-D1* | | | *Dark green fragments*: abundant large Ti oxide, (Cr,Fe) oxide, few sericite, barite, monazite | |
| | | | KG-C3 | S: 20°53'35.3"<br>E: 120°04'24.5"<br>Stratiform chert (S-chert) | Massive bright green chert | Abundant sericite, Ti oxide, (Al, As, Si, Ca) phosphate, rare zircon | |
| | | | KG-FC1 | S: 20°53'41.2"<br>E: 120°04'20.6"<br>Feeder dike to stratiform chert (S-chert) | Fine grained, black chert intersected by some white/translucent chert veins | Mainly sericite, few Ti oxide, (Al,Mg,Ce) phosphate/sulfate and rare zircon and (Ni,Co) sulfide (with traces of As) | |
| Kangaroo Caves Formation | Sulphur Spring chert | ~3260 | SS-C1-G* | S: 21°05'56.2"<br>E: 119°11'11.1"E<br>Base stratiform chert (S-chert) | Alternation of mainly gray and black chert laminae. Gray internally laminated layers contain fine elongated grains oriented // bedding. Black very fine grained chert shows irregular, sometimes wrinkly laminations | *Gray*: some sericite (lath shapes), abundant small Ti oxide, few zircon and monazite | 17, 18, 19 |
| | | | SS-C1-B | | | *Black*: many (Fe,Mg) silicate, sericite and pyrite, few Ti oxide and Fe(oxi)hydroxide (with traces of Mn and Mg) and rare apatite. | |
| Dresser Formation (?) | McPhee chert | ~3490 (?) | McP-A5 | S: 21°00'45.5"<br>E: 119°48'22.2"<br>Base stratiform chert (S-chert) | Very fine grained, green chert; faint internal laminations visible | Several large (Fe,Mg) silicates (some with traces of As), some sericite, (Cr,Fe) oxide, (Fe,Zn) oxide, Ti oxide and rare monazite and galena | - |
| Cleaverville Formation | Point Samson chert | ~3020 | PS-C2 | S: 20°38.065'<br>E: 117°11.746'<br>Top stratiform chert (C-chert) | Fine grained, dark gray to black chert intersected by many translucent/gray-white zones/veins and small purple/brown veins | Large goethite, Fe(oxi)hydroxide (irregular shapes) and pyrite (cubic), minor siderite and barite, some carbon clots | 3, 20 |
| | | | PS-B2-G1* | S: 20°38.163'<br>E: 117°11.683'<br>Middle stratiform chert (C-chert) | Regular alternation of milky-white, gray and translucent chert layers. Gray chert bands are fine grained and contain peloids. | *Gray*: porous groundmass with goethite and Fe(oxi)hydroxide, tiny Ti oxide, (Cu,Zn) oxide and (Al,Fe) silicates | |
| | | | PS-B2-W1* | | | *White*: few goethite and Fe(oxi)hydroxide | |
| | Snapper Beach BIF | ~3020 | CV-F1-B1* | S: 20°38.935'<br>E: 117°02.043'<br>Stratiform chert (C-chert) | Regular alternation of thick milky-white chert and brown (Fe-rich) bands | *Brown*: abundant large Fe(oxi)hydroxide (goethite), some carbon clots | 21, 22, 23, 24, 25 |
| | | | CV-F1-W1* | | | *White:* few large Fe(oxi)hydroxide with quartz cores and rare pyrite. Some Fe(oxi)hydroxide contain patches of siderite | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Dixon Island chert | | CV-C6 | S: 20°39.472'<br>E: 116°59.285' | Massive dark gray/black chert intersected by multiple small translucent quartz veinlets | Few large and many small (Ca,Mg,Fe) carbonate (rhombic), carbon clots, Fe(oxi)hydroxide, few pyrite and barite and rare (Cu,Zn) oxide | |

*: Asterisk indicates the sub-domains in individual samples that have been analyzed for Si isotope composition.
†: Accessory minerals are disseminated in a microcrystalline quartz groundmass, except for CV-F1-B and MB-09-R1 where mentioned minerals are dominant.
$: Numbers refer to following references:

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**Table DR2:** Major and trace element contents and silicon isotope data of early-Archean cherts from the Pilbara Craton, Western Australia.*

| **Unit** | **North Pole** | | | **McPhee** | **Marble Bar** | | | **Apex** | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sample code** | NP-FC9 | NP-FC8 | NP-CU5 | McP-A5 | MB-04-W1 | MB-04-B1 | MB-09-R1 | APC-FB1-W1 | APC-FB1-G1 | APC-B1 |
| **Type** | S-chert | C-chert | C-chert | S-chert | C-chert | C-chert | C-chert | C-chert | C-chert | S-chert |
| | Dike | Dike | Stratiform | Stratiform | Stratiform | Stratiform | Stratiform | Dike | Dike | Stratiform |
| **Major elements (%)**[†] | | | | | | | | | | |
| $SiO_2$ | 98.40 | 99.38 | 99.34 | 98.14 | 99.56 | 91.39 | 68.60 | 99.98 | 99.92 | 96.39 |
| $Al_2O_3$ | 1.17 | 0.28 | 0.28 | 1.00 | 0.00 | 0.07 | 0.17 | 0.00 | 0.03 | 2.31 |
| $TiO_2$ | 0.05 | 0.01 | 0.05 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 |
| CaO | 0.00 | 0.03 | 0.07 | 0.01 | <d.l. | 0.01 | 0.02 | 0.00 | 0.00 | 0.01 |
| FeO[$] | 0.06 | 0.14 | 0.12 | 0.40 | 0.41 | 8.43 | 31.07 | 0.01 | 0.03 | 0.46 |
| MgO | 0.02 | 0.02 | 0.04 | 0.08 | 0.01 | 0.02 | 0.02 | 0.00 | 0.00 | 0.03 |
| MnO | <d.l. | 0.00 | 0.01 | 0.00 | 0.00 | 0.03 | 0.03 | <d.l. | 0.00 | <d.l. |
| $K_2O$ | 0.24 | 0.02 | 0.06 | 0.24 | <d.l. | 0.02 | 0.01 | <d.l. | 0.01 | 0.57 |
| $Na_2O$ | 0.04 | 0.01 | 0.03 | 0.01 | 0.02 | 0.01 | 0.01 | 0.00 | 0.01 | 0.04 |
| $P_2O_5$ | <d.l. | 0.00 | <d.l. | 0.01 | <d.l. | 0.01 | 0.02 | <d.l. | <d.l. | 0.01 |
| **Trace elements (ppm)**[#] | | | | | | | | | | |
| V | 11.2 | 2.08 | n.m. | 38.0 | 0.110 | 0.664 | 0.863 | 0.142 | 0.404 | 14.1 |
| Cr | 13.2 | 2.14 | n.m. | 462 | 2.292 | 2.06 | 0.734 | 0.928 | 0.622 | 40.4 |
| Co | 0.531 | 6.17 | n.m. | 8.85 | 0.598 | 4.96 | 5.97 | 0.018 | 0.079 | 0.266 |
| Ni | 12.2 | 26.4 | n.m. | 85.5 | 11.3 | 32.8 | 155 | 8.15 | 65.2 | 16.7 |
| Cu | 8.31 | 72.8 | n.m. | 2.13 | 2.31 | 305 | 13.4 | 3.53 | 4.84 | 87.6 |
| Zn | 15.4 | 147 | n.m. | 227 | 11.4 | 19.7 | 54.0 | 1.85 | 2.46 | 3.28 |
| Ga | 2.21 | 0.453 | n.m. | 2.54 | 0.046 | 0.321 | 0.400 | 0.014 | 0.050 | 2.63 |
| Rb | 5.96 | 0.510 | n.m. | 14.8 | 0.043 | 0.064 | 0.039 | 0.012 | 0.256 | 14.0 |
| Sr | 5.59 | 2.73 | n.m. | 4.08 | 0.299 | 4.73 | 0.787 | 0.129 | 1.02 | 38.2 |
| Y | 1.35 | 0.559 | n.m. | 2.27 | 0.123 | 3.96 | 3.55 | 0.064 | 0.559 | 3.75 |
| Zr | 12.8 | 0.806 | n.m. | 16.0 | 0.100 | 0.519 | 0.636 | 0.441 | 0.607 | 24.6 |
| Nb | 0.761 | 0.037 | n.m. | 1.58 | 0.002 | 0.029 | 0.033 | 0.021 | 0.063 | 1.57 |
| Cs | 0.226 | 0.170 | n.m. | 0.558 | 0.011 | 0.032 | 0.016 | 0.009 | 0.178 | 0.495 |
| Ba | 654 | 595 | n.m. | 286 | 0.591 | 25.6 | 2.63 | 1.35 | 7.34 | 440 |
| La | 1.68 | 0.320 | n.m. | 0.927 | 0.092 | 1.20 | 0.758 | 0.002 | 0.117 | 6.15 |
| Ce | 3.18 | 0.714 | n.m. | 2.28 | 0.149 | 2.84 | 1.12 | 0.005 | 0.273 | 11.5 |
| Pr | 0.367 | 0.093 | n.m. | 0.319 | 0.019 | 0.273 | 0.134 | 0.001 | 0.036 | 1.27 |
| Nd | 1.38 | 0.408 | n.m. | 1.47 | 0.080 | 1.15 | 0.600 | 0.003 | 0.152 | 4.82 |

**(Table DR2 continued)**

| **Unit** | **Kitty's Gap** | | | | | | | | **Sulph. Spr.** | **Cleaverville** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sample code** | L1-13.3b-W1 | L1-13.3b-B1 | L1-13.3b-B2 | L1-13.3b-G1 | L1-73B-G1 | L1-73B-D1 | KG-C3 | KG-FB1 | SS-C1 | CV-C6 |
| **Type** | S-chert | S-chert | S-chert | S-chert | S-chert | S-chert | S-chert | S-chert | S-chert | C-chert |
| | Stratiform | Stratiform | Stratiform | Stratiform | Stratiform | Stratiform | Stratiform | Dike | Stratiform | Stratiform |
| **Major elements (%)**[†] | | | | | | | | | | |
| $SiO_2$ | 87.21 | 96.12 | 94.93 | 92.32 | 98.93 | 96.56 | 94.79 | 98.82 | 98.19 | 99.26 |
| $Al_2O_3$ | 9.31 | 2.54 | n.m. | 5.68 | 0.65 | 1.99 | 3.76 | 0.77 | 1.48 | 0.03 |
| $TiO_2$ | 0.54 | 0.43 | n.m. | 0.28 | 0.18 | 0.41 | 0.08 | 0.02 | 0.10 | 0.00 |
| CaO | 0.01 | <d.l. | n.m. | 0.01 | <d.l. | 0.01 | <d.l. | <d.l. | 0.00 | 0.11 |
| FeO[$] | 0.08 | <d.l. | n.m. | 0.02 | <d.l. | 0.12 | <d.l. | 0.01 | 0.03 | 0.46 |
| MgO | 0.12 | 0.14 | n.m. | 0.06 | <d.l. | 0.12 | <d.l. | 0.03 | 0.01 | 0.10 |
| MnO | 0.00 | <d.l. | n.m. | <d.l. | <d.l. | 0.00 | <d.l. | <d.l. | <d.l. | 0.02 |
| $K_2O$ | 2.58 | 0.70 | n.m. | 1.53 | 0.21 | 0.67 | 1.28 | 0.28 | 0.17 | 0.00 |
| $Na_2O$ | 0.13 | 0.05 | n.m. | 0.09 | <d.l. | 0.03 | 0.03 | 0.01 | 0.01 | 0.01 |
| $P_2O_5$ | 0.02 | 0.01 | n.m. | 0.01 | <d.l. | 0.01 | 0.02 | 0.00 | 0.01 | <d.l. |
| **Trace elements (ppm)**[#] | | | | | | | | | | |
| V | 48.6 | 13.4 | n.m. | n.m. | 17.9 | 48.8 | 23.8 | 6.82 | 6.57 | 0.518 |
| Cr | 11.6 | 6.22 | n.m. | n.m. | 244 | 519 | 289 | 13.4 | 25.3 | 0.380 |
| Co | 0.451 | 0.438 | n.m. | n.m. | 4.37 | 6.46 | 0.173 | 1.21 | 0.098 | 0.178 |
| Ni | 4.34 | 13.3 | n.m. | n.m. | 22.8 | 37.4 | 13.9 | 17.4 | 14.4 | 23.7 |
| Cu | 4.98 | 6.80 | n.m. | n.m. | 13.8 | 5.92 | 1.63 | 20.4 | 1.28 | 0.712 |
| Zn | 4.53 | 13.1 | n.m. | n.m. | 32.2 | 45.1 | 5.66 | 7.11 | 3.46 | 2.58 |
| Ga | 10.0 | 3.01 | n.m. | n.m. | 0.589 | 2.90 | 2.42 | 1.61 | 3.41 | 0.028 |
| Rb | 41.1 | 12.0 | n.m. | n.m. | 4.50 | 19.7 | 17.7 | 5.96 | 6.99 | 0.273 |
| Sr | 19.8 | 10.2 | n.m. | n.m. | 1.32 | 3.15 | 2.27 | 1.20 | 8.07 | 0.490 |
| Y | 11.9 | 5.57 | n.m. | n.m. | 0.531 | 2.19 | 3.51 | 0.821 | 3.99 | 0.465 |
| Zr | 88.1 | 30.1 | n.m. | n.m. | 10.0 | 18.8 | 24.5 | 10.0 | 31.7 | 0.105 |
| Nb | 6.85 | 1.35 | n.m. | n.m. | 0.043 | 1.21 | 1.47 | 0.414 | 1.86 | 0.015 |
| Cs | 1.45 | 0.410 | n.m. | n.m. | 0.130 | 0.530 | 0.206 | 0.119 | 0.126 | 0.101 |
| Ba | 86.9 | 36.2 | n.m. | n.m. | 6.30 | 16.6 | 14.1 | 15.8 | 106 | 4.09 |
| La | 9.68 | 13.7 | n.m. | n.m. | 0.249 | 0.950 | 1.40 | 0.644 | 15.0 | 0.136 |
| Ce | 21.2 | 31.3 | n.m. | n.m. | 0.411 | 1.07 | 3.20 | 1.32 | 24.3 | 0.312 |
| Pr | 2.56 | 3.82 | n.m. | n.m. | 0.096 | 0.320 | 0.402 | 0.153 | 2.47 | 0.037 |
| Nd | 10.4 | 15.3 | n.m. | n.m. | 0.424 | 1.48 | 1.68 | 0.600 | 7.44 | 0.152 |

**(Table DR2 continued)**

| **Unit** | **Cleaverville** | | **Point Samson** | | |
|---|---|---|---|---|---|
| **Sample code** | CV-F1-W1 | CV-F1-B1 | PS-B2-W1 | PS-B2-G1 | PS-C2 |
| **Type** | C-chert | C-chert | C-chert | C-chert | C-chert |
| | Stratiform | Stratiform | Stratiform | Stratiform | Stratiform |
| **Major elements (%)**[†] | | | | | |
| $SiO_2$ | 97.19 | 40.39 | 99.93 | 99.70 | 98.38 |
| $Al_2O_3$ | 0.04 | 0.39 | 0.01 | 0.30 | 0.22 |
| $TiO_2$ | 0.00 | 0.01 | 0.00 | n.m. | 0.00 |
| CaO | 0.02 | 0.01 | <d.l. | n.m. | 0.00 |
| FeO[$] | 2.62 | 58.51 | 0.03 | n.m. | 0.55 |
| MgO | 0.09 | 0.02 | 0.00 | n.m. | 0.00 |
| MnO | 0.02 | 0.01 | 0.00 | n.m. | <d.l. |
| $K_2O$ | <d.l. | 0.00 | 0.00 | n.m. | 0.05 |
| $Na_2O$ | 0.01 | 0.01 | 0.01 | n.m. | 0.02 |
| $P_2O_5$ | 0.01 | 0.65 | <d.l. | n.m. | <d.l. |
| **Trace elements (ppm)**[#] | | | | | |
| V | 0.339 | 4.38 | 0.47 | 0.772 | 1.42 |
| Cr | 0.827 | 11.3 | 3.04 | 8.25 | 8.22 |
| Co | 0.103 | 4.06 | 0.659 | 0.214 | 2.48 |
| Ni | 5.38 | 111 | 404 | 19.6 | 82.1 |
| Cu | 0.825 | 3.44 | 1.17 | 3.07 | 1.73 |
| Zn | 10.9 | 78.4 | 4.37 | 5.11 | 22.1 |
| Ga | 0.213 | 0.675 | 0.291 | 0.559 | 2.06 |
| Rb | 0.053 | 0.200 | 0.154 | 0.292 | 3.56 |
| Sr | 0.971 | 2.09 | 2.91 | 2.47 | 1.54 |
| Y | 0.738 | 13.3 | 0.345 | 2.68 | 0.468 |
| Zr | 0.048 | 2.02 | 0.738 | 1.47 | 8.83 |
| Nb | 0.003 | 0.086 | 0.033 | 0.101 | 0.243 |
| Cs | 0.165 | 0.018 | 0.017 | 0.023 | 0.188 |
| Ba | 0.622 | 2.15 | 12.2 | 64.6 | 171 |
| La | 0.240 | 3.78 | 0.615 | 0.633 | 0.388 |
| Ce | 0.442 | 5.67 | 0.710 | 0.940 | 0.618 |
| Pr | 0.052 | 0.736 | 0.062 | 0.092 | 0.072 |
| Nd | 0.222 | 3.18 | 0.197 | 0.332 | 0.267 |

**(Table DR2 continued)**

| **Unit** | **North Pole** | | | **McPhee** | **Marble Bar** | | | **Apex** | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sample code** | NP-FC9 | NP-FC8 | NP-CU5 | McP-A5 | MB-04-W1 | MB-04-B1 | MB-09-R1 | APC-FB1-W1 | APC-FB1-G1 | APC-B1 |
| **Type** | S-chert Dike | C-chert Dike | C-chert Stratiform | S-chert Stratiform | C-chert Stratiform | C-chert Stratiform | C-chert Stratiform | C-chert Dike | C-chert Dike | S-chert Stratiform |
| **Trace elements**[#] | | | | | | | | | | |
| Sm | 0.265 | 0.110 | n.m. | 0.380 | 0.019 | 0.270 | 0.158 | 0.001 | 0.031 | 0.895 |
| Eu | 0.189 | 0.146 | n.m. | 0.093 | 0.011 | 0.166 | 0.128 | 0.001 | 0.018 | 0.333 |
| Gd | 0.221 | 0.110 | n.m. | 0.416 | 0.021 | 0.373 | 0.244 | 0.004 | 0.043 | 1.08 |
| Tb | 0.035 | 0.017 | n.m. | 0.068 | 0.003 | 0.060 | 0.036 | 0.001 | 0.008 | 0.174 |
| Dy | 0.251 | 0.108 | n.m. | 0.427 | 0.018 | 0.451 | 0.278 | 0.009 | 0.067 | 0.948 |
| Ho | 0.050 | 0.020 | n.m. | 0.085 | 0.004 | 0.102 | 0.064 | 0.002 | 0.015 | 0.135 |
| Er | 0.169 | 0.058 | n.m. | 0.242 | 0.010 | 0.354 | 0.236 | 0.006 | 0.049 | 0.411 |
| Tm | 0.028 | 0.008 | n.m. | 0.034 | 0.001 | 0.057 | 0.038 | 0.001 | 0.008 | 0.065 |
| Yb | 0.196 | 0.053 | n.m. | 0.208 | 0.010 | 0.395 | 0.267 | 0.006 | 0.049 | 0.433 |
| Lu | 0.030 | 0.008 | n.m. | 0.029 | 0.001 | 0.067 | 0.048 | 0.001 | 0.007 | 0.067 |
| Hf | 0.306 | 0.020 | n.m. | 0.380 | 0.001 | 0.009 | 0.014 | 0.005 | 0.011 | 0.619 |
| Pb | 7.40 | 2.82 | n.m. | 1.91 | 0.535 | 2.61 | 5.23 | 0.254 | 0.689 | 61.6 |
| Th | 0.599 | 0.028 | n.m. | 0.205 | 0.001 | 0.019 | 0.026 | 0.001 | 0.019 | 1.52 |
| U | 0.136 | 0.048 | n.m. | 0.056 | 0.002 | 0.015 | 0.021 | 0.004 | 0.013 | 0.371 |
| **REE anomalies**** | | | | | | | | | | |
| Eu/Eu* | 3.21[††] | 5.62 | n.m. | 0.99 | 2.41 | 2.29 | 2.97 | 1.77 | 1.97 | 1.46 |
| Y/Ho | 27.2 | 28.6 | n.m. | 26.6 | 31.1 | 38.8 | 55.2 | 33.4 | 37.6 | 27.7 |
| **Si isotopes**[$$] | | | | | | | | | | |
| $\delta^{30}Si_{NBS28}$ (‰) | 0.71 | 0.38 | 0.57 | 0.59 | -0.43 | 0.29 | -0.44 | -1.45 | -1.48 | 0.14 |
| s.d. | 0.00 | 0.19 | 0.08 | 0.05 | 0.02 | 0.14 | 0.22 | 0.11 | 0.22 | 0.13 |

**(Table DR2 continued)**

| **Unit** | **Kitty's Gap** | | | | | | | | **Sulph. Spr.** | **Cleaverville** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sample code** | L1-13.3b-W1 | L1-13.3b-B1 | L1-13.3b-B2 | L1-13.3b-G1 | L1-73B-G1 | L1-73B-D1 | KG-C3 | KG-FB1 | SS-C1 | CV-C6 |
| **Type** | S-chert Stratiform | S-chert Stratiform | S-chert Stratiform | S-chert Stratiform | S-chert Stratiform | S-chert Stratiform | S-chert Stratiform | S-chert Dike | S-chert Stratiform | C-chert Stratiform |
| **Trace elements[#]** | | | | | | | | | | |
| Sm | 2.40 | 3.04 | n.m. | n.m. | 0.107 | 0.386 | 0.404 | 0.140 | 1.17 | 0.035 |
| Eu | 0.781 | 0.821 | n.m. | n.m. | 0.037 | 0.132 | 0.112 | 0.054 | 0.263 | 0.031 |
| Gd | 2.29 | 2.18 | n.m. | n.m. | 0.092 | 0.405 | 0.465 | 0.145 | 0.861 | 0.050 |
| Tb | 0.337 | 0.251 | n.m. | n.m. | 0.014 | 0.057 | 0.080 | 0.022 | 0.126 | 0.009 |
| Dy | 2.11 | 1.30 | n.m. | n.m. | 0.092 | 0.369 | 0.524 | 0.143 | 0.728 | 0.061 |
| Ho | 0.382 | 0.197 | n.m. | n.m. | 0.017 | 0.070 | 0.112 | 0.026 | 0.145 | 0.014 |
| Er | 1.16 | 0.520 | n.m. | n.m. | 0.054 | 0.221 | 0.348 | 0.083 | 0.446 | 0.044 |
| Tm | 0.167 | 0.068 | n.m. | n.m. | 0.008 | 0.032 | 0.055 | 0.013 | 0.070 | 0.007 |
| Yb | 1.04 | 0.399 | n.m. | n.m. | 0.054 | 0.208 | 0.370 | 0.089 | 0.472 | 0.043 |
| Lu | 0.149 | 0.052 | n.m. | n.m. | 0.008 | 0.030 | 0.059 | 0.014 | 0.073 | 0.007 |
| Hf | 1.95 | 0.843 | n.m. | n.m. | 0.212 | 0.517 | 0.600 | 0.241 | 0.778 | 0.002 |
| Pb | 10.2 | 8.66 | n.m. | n.m. | 2.20 | 4.70 | 0.687 | 3.20 | 43.1 | 0.363 |
| Th | 2.38 | 1.25 | n.m. | n.m. | 0.062 | 0.235 | 1.51 | 0.298 | 1.47 | 0.003 |
| U | 0.676 | 0.395 | n.m. | n.m. | 0.092 | 0.129 | 0.379 | 0.101 | 0.368 | 0.039 |
| **REE anomalies**** | | | | | | | | | | |
| Eu/Eu* | 1.44 | 1.38 | n.m. | n.m. | 1.56 | 1.48 | 1.08 | 1.63 | 1.08 | 3.15 |
| Y/Ho | 31.2 | 28.3 | n.m. | n.m. | 30.6 | 31.3 | 31.3 | 31.3 | 27.6 | 33.4 |
| **Si isotopes[$$]** | | | | | | | | | | |
| $\delta^{30}Si_{NBS28}$ (‰) | 0.21 | 0.39 | 0.41 | 0.19 | 0.93 | 1.08 | 0.21 | 0.77 | 0.23 | -0.27 |
| s.d. | 0.08 | 0.13 | 0.02 | 0.16 | 0.18 | 0.03 | 0.06 | 0.03 | 0.00 | 0.25 |

**(Table DR2 continued)**

| **Unit** | **Cleaverville** | | **Point Samson** | | |
|---|---|---|---|---|---|
| **Sample code** | CV-F1-W1 | CV-F1-B1 | PS-B2-W1 | PS-B2-G1 | PS-C2 |
| **Type** | C-chert | C-chert | C-chert | C-chert | C-chert |
| | Stratiform | Stratiform | Stratiform | Stratiform | Stratiform |
| **Trace elements**[#] | | | | | |
| Sm | 0.055 | 0.857 | 0.021 | 0.065 | 0.050 |
| Eu | 0.035 | 0.446 | 0.010 | 0.044 | 0.033 |
| Gd | 0.063 | 0.953 | 0.019 | 0.117 | 0.048 |
| Tb | 0.009 | 0.128 | 0.003 | 0.023 | 0.009 |
| Dy | 0.053 | 0.812 | 0.021 | 0.185 | 0.060 |
| Ho | 0.011 | 0.184 | 0.006 | 0.053 | 0.014 |
| Er | 0.044 | 0.916 | 0.018 | 0.168 | 0.048 |
| Tm | 0.006 | 0.133 | 0.002 | 0.021 | 0.008 |
| Yb | 0.037 | 0.845 | 0.013 | 0.098 | 0.058 |
| Lu | 0.006 | 0.154 | 0.002 | 0.012 | 0.009 |
| Hf | 0.001 | 0.051 | 0.018 | 0.037 | 0.086 |
| Pb | 0.158 | 1.13 | 7.48 | 8.18 | 7.37 |
| Th | 0.003 | 0.147 | 0.012 | 0.065 | 0.055 |
| U | 0.003 | 0.700 | 0.006 | 0.033 | 0.091 |
| **REE anomalies**** | | | | | |
| Eu/Eu* | 2.66 | 2.25 | 2.02 | 2.00 | 2.71 |
| Y/Ho | 69.2 | 72.3 | 59.9 | 51.0 | 33.0 |
| **Si isotopes**[$$] | | | | | |
| $\delta^{30}Si_{NBS28}$ (‰) | -1.59 | 0.20 | -0.45 | -1.01 | 0.69 |
| s.d. | 0.06 | 0.02 | 0.03 | 0.12 | 0.13 |

<d.l. = below detection limit; n.m. = not measured

* Sample material was obtained from polished rock slabs by employing a micro-drilling technique with a spatial resolution of 1mm.

† Major elements were measured using a Varian ICP-AES and normalized to 100% (except for sample L1-13.3b-B2 for which only $SiO_2$ content is available). Drilled sample material was digested using standard $HF/HNO_3$ techniques and dissolved in 5 ml 1% $HNO_3$. The use of HF prevented the analysis of silica in these solutions and therefore silica concentrations were measured in NaOH digests that were also used for isotope analysis (see Van den Boorn et al., 2006). Reported silica concentrations are the averages of duplicate samples. Typical precision of the ICP-AES analyses was ~3%.

$ All iron expressed as FeO.

[#] Trace element analyses were performed on a quadrupole Agilent ICP-MS. Drilled sample material was digested using standard HF/$HNO_3$ techniques and dissolved in 3 ml 1% $HNO_3$ in order to facilitate REE analysis in cherts with very low concentrations. BHVO-2 was used as calibration standard and AGV-2 to check reproducibility and accuracy. Typical precision of ICP-MS analysis was ~5-10%.

** Eu anomalies were calculated following Bau and Dulski (1999): $Eu/Eu^* = Eu_n/(0.67*Sm_n+0.33*Tb_n)$, where n denotes normalization against MUQ (Kamber et al., 2005); Y/Ho are ratios of un-normalized concentrations.

[††] This S-chert (NP-FC9) from the North Pole dike deviates from other S-cherts in showing a conspicuous Eu/Eu* anomaly. This can be explained by metasomatic overprinting, which probably affected the gray dike cherts in this area (Ueno et al., 2004).

[$$] Silicon isotope ratios were determined on interference free plateaus using a ThermoFinnigan Neptune MC-ICPMS as outlined in Van den Boorn et al. (2006), but with slightly modified cup settings: we determined $^{28}Si$ on L4, $^{29}Si$ on L1 and $^{30}Si$ on C. All measurements were performed in medium resolution mode. The silicon isotope data are reported as permil deviations from the NIST RM 8546 (=NBS28) standard using a standard bracketing technique. The Diatomite standard was included in every sequence to check for accuracy and reproducibility (Reynolds et al., 2007): 1.3 ± 0.14‰ (1 s.d.).

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