Supplementary Appendix IV

Table 1: Stratigraphic unit, age and reference for age data used to determine the possible source areas for the Keis supergroup.

| **No** | **Stratigraphic unit** | **Age** | **Reference** |
| --- | --- | --- | --- |
| 1 | Dolerite intrusions (U–Pb baddeleyite) | ~1879 Ma to ~1872 Ma | Hanson et al. (2004) |
| 2 | Dolerite intrusion (U–Pb baddeleyite) | ~1972 Ma  | Hanson et al. (2004) |
| 3 | Waterberg Group | 1880 to 2054 ± 4 Ma | de Kock (2006); (Andersen et al., 2019b) |
| 4 | Klipfontein kimberlite | 1898 ± 17 Ma | Schmitz and Bowring (2000) |
| 5 | Trompsburg gabbro | 1915 ± 17 Ma | Maier et al. (2003) |
| 6 | Hartley volcanics | 1915.6 ± 1.4 Ma | Cornell et al. (2016) |
| 7 | Intrusive charno-enderbites | Late tectonic 1923 ± 27Ma and 1960 Ma | Munyanyiwa et al. (1995) |
| 8 | Urungwe granite | Syn-tectonic 1997 ± 3 Ma | Hilliard (1999) |
| 9 | Metasyenite from Central zone, Limpopo belt | 2010.3 ± 4.5 Ma | Rigby and Armstrong (2011) |
| 10 | Vredefort central intrusive granite | 2017 ±5 Ma | Gibson et al. (1997) |
| 11 | Entabeni granite | 2021 ± 5Ma | Dorland (2004) |
| 12 | Entabeni granite; Limpopo Belt | 2023 ± 6 Ma | Zeh et al. (2009) |
| 13 | Mahalapye granite | 2023 ± 11Ma | McCourt and Armstrong (1998) |
| 14 | Thipise gneiss  | 2023 ± 11 Ma | Kröner et al. (2000) |
| 15 | Kubu Island granite | 2039 ± 1.4Ma | Majaule et al. (1994) |
| 16 | Syenite; Schiel Alkaline Complex | 2051 ± 6 Ma | Laurent and Zeh (2015) |
| 17 | Rust de Winter quartz porphyry | 2051 ± 7.9Ma | Dorland (2004) |
| 18 | Lose Quarry granodiorite | 2053 ± 21Ma | McCourt and Armstrong (1998) |
| 19 | Websterite; Schiel Alkaline Complex | 2054 ± 6 Ma | Laurent and Zeh (2015) |
| 20 | Swaershoek quartz porphyry | 2054.1 ± 3.5Ma | Dorland (2004) |
| 21 | Nebo granite | 2054 ± 2Ma | Walraven and Hattingh (1993) |
| 22 | Bushveld Complex | 2055.91 ± 0.26 Ma | Zeh et al. (2015) |
| 23 | Hekpoort tuff | 2225 ± 3 Ma | Dorland (2004) |
| 24 | Westerberg sill | 2426 ± 1 Ma | Kampmann et al. (2015) |
| 25 | Riries tuff | 2454 ± 25.3 Ma to 2478 ± 5.7 Ma | Pickard (2003) |
| 26 | Tshipise gneiss | 2512 ± 7 Ma | Kröner et al. (1999) |
| 27 | Gamohaan tuff | 2516 ± 4 Ma | Altermann and Nelson (1998) |
| 28 | Swejane granite | 2517 ± 33 Ma | Holzer et al. (1999) |
| 29 | Zanzibar gneiss | 2521 ±3 Ma | Kröner et al. (1999) |
| 30 | Nauga tuff | 2549 ± 7 Ma | Altermann and Nelson (1998) |
| 31 | Monteville tuff | 2555 ± 19 Ma | Altermann and Nelson (1998) |
| 32 | Bulai Gneiss enderbite | 2516 ± 60 Ma  | Kröner et al. (1999) |
| 33 | Bulai Gneiss granite | 2572 ± 4 Ma | Barton et al. (1994) |
| 34 | Blackreef Formation | 2588 ± 6 Ma  | Jolley et al. (2005) |
| 35 | Makowe granite | 2595 ± 13 Ma | McCourt and Armstrong (1998) |
| 36 | Bulai gneiss | 2608 ± 2 Ma | Kröner et al. (1999) |
| 37 | Alldays gneiss | 2610 ± 75 Ma | Kröner et al. (1999) |
| 38 | Rooiwater Complex | 2611 ± 10 Ma | Zeh et al. (2009) |
| 39 | Zanzibar gneiss | 2612 ± 0.2 Ma | Kröner et al. (1999) |
| 40 | Pre Bulai leucogranite | 2620 ± 8 Ma | Kröner et al. (1999) |
| 41 | Lovedale kimberlite eclogite | 2630 ± 1 Ma | Schmitz and Bowring (2000) |
| 42 | Selebi Phikwe granitoid | 2652 ± 50 Ma | McCourt and Armstrong (1998) |
| 43 | Vryburg lava | 2642 Ma | Walraven and Martini (1995) |
| 44 | Buffelsfontien lavas | 2664 ± 0.7 Ma | Barton et al. (1995) |
| 45 | Mashishimale granite | 2677 ± 14 Ma | Poujol (2001) |
| 46 | Monzogranite; Matlala Pluton | 2677 ±5 Ma | Laurent and Zeh (2015) |
| 47 | Uitloop Granite, Limpopo Belt | 2679 ± 8 Ma | Zeh et al. (2009) |
| 48 | Matok-, Moletsi- and Mash plutons | 2680 Ma to 2688 Ma | Laurent and Zeh (2015) |
| 49 | Singelele gneiss | 2681 ± 8 Ma | Kröner et al. (1999) |
| 50 | Post Uitkyk granite | 2687 ± 2 Ma | De Wit et al. (1993) |
| 51 | Pre Morokweng granophyre | 2689 ± 5 Ma | Reimold et al. (2002) |
| 52 | Mbabane granitoid | 2691 ± 4 Ma | Layer et al. (1991) |
| 53 | Matlala granite | 2693 ± 7 Ma | Laurent and Zeh (2015) |
| 54 | Mashishimale granite | 2698 ± 21 Ma | Poujol (2001) |
| 55 | Mpageni granite | 2698 ± 7 Ma | Zeh et al. (2009) |
| 56 | Trondhjemite; Pietersburg block | 2700 | Vezinet (2017) |
| 57 | Makwassie quartz porphyry | 2709 ± 4 Ma | Armstrong et al. (1991) |
| 58 | Klipriviersberg Group | 2714 ± 8 Ma | Armstrong et al. (1991) |
| 59 | Leucogranite; Pietersburg Block | ~2717 Ma | Vezinet (2017) |
| 60 | Skalkseput granite | 2718 ± 8 Ma | McCourt et al. (2000) |
| 61 | Granite; Pietersburg Block | ~2722 Ma | Vezinet (2017) |
| 62 | Ancient Gneiss Complex, Swaziland | 2722 ± 7Ma | Zeh et al. (2011) |
| 63 | Welkom West granitoid | 2727 ± 6 Ma | Robb et al. (1992) |
| 64 | Ancient Gneiss Complex, Swaziland | 2727 ± 10Ma | Zeh et al. (2011) |
| 65 | Venterspost Formation | 2729 ± 19 Ma | Kositcin and Krapež (2004) |
| 66 | Rooiwater tonalite | 2740 ± 4 Ma | Poujol (2001) |
| 67 | Amalia Greenstone Belt | 2754 ± 4.6 Ma | Poujol et al. (2005) |
| 68 | Turfloop granite | 2757 ± 9 Ma | Laurent and Zeh (2015) |
| 69 | Turfloop granite | 2762 ± 5 Ma to 2768 ± 5 Ma | Henderson et al. (2000) |
| 70 | Goudplaats gneiss | 2767 ± 5 Ma | Laurent and Zeh (2015) |
| 71 | Turfloop granite | 2770 Ma and 2773 Ma | Laurent and Zeh (2015) |
| 72 | Rooibokvlei granodiorite | 2777 ± 35 Ma | Anhaeusser and Poujol (2004) |
| 73 | Kgale granite | 2779 ± 2.8 Ma | Grobler and Walraven (1993) |
| 74 | Granitic dike | 2779 ± 7 Ma | Laurent and Zeh (2015) |
| 75 | Kanye volcanic Formation | 2780 ± 2 Ma | Walraven et al. (1996) |
| 76 | Turfloop granite | 2782 ± 13 Ma | Zeh et al. (2009) |
| 77 | Gaborone granite | 2783 ± 4 Ma | Grobler and Walraven (1993) |
| 78 | Kgale granite | 2783 ± 2 Ma | Moore et al. (1993) |
| 79 | Kanye volcanics | 2783 ± 1.1 Ma to 2784 ± 1.8 Ma | Grobler and Walraven (1993); Moore et al. (1993) |
| 80 | Groot Letaba gneiss | 2784 ± 8 Ma | Zeh et al. (2009) |
| 81 | Granite vein; Goudplaats gneiss | 2790 ± 5 Ma | Laurent and Zeh (2015) |
| 82 | Mosita granite | 2791 ± 8 Ma | Poujol et al. (2000) |
| 83 | Lekkersmaak granite | 2795 ± 8 Ma | Zeh et al. (2009) |
| 84 | Rooibokvlei granodiorite | 2797 ± 2 Ma | Anhaeusser and Poujol (2004) |
| 85 | Post Giyani gneiss | 2810 ± 0.4 Ma | Kröner et al. (2000) |
| 86 | Kraaipan Formation | 2816 ± 16 Ma | Anhaeusser and Walraven (1999) |
| 87 | Archean granite, Polokwane area | 2820 Ma and 2821 Ma  | Magwaza (2019) |
| 88 | Palmietfontein granite | 2828 ± 7 Ma | Laurent and Zeh (2015) |
| 89 | Majwana granite | 2830 ± 10 Ma | Sibiya (1998) |
| 90 | Turfloop batholith | 2830 ± 9 Ma | Laurent and Zeh (2015) |
| 91 | Meinhardskraal granite | 2833 ± 5 Ma | Laurent and Zeh (2015) |
| 92 | Groot Letaba gneiss | 2839 ± 8 Ma | Zeh et al. (2009) |
| 94 | Amalia granitoid | 2846 ± 22 Ma | Anhaeusser and Walraven (1997) |
| 95 | Meinhardskraal granite | 2841 ± 4 Ma | Laurent and Zeh (2015) |
| 96 | Murchison pegmatite | 2848 ± 58 Ma | Poujol and Robb (1999) |
| 97 | Draghoender gneiss granite | 2853 ± 4 Ma | McCourt and Armstrong (1998) |
| 98 | Melkboomfontein granite | 2853 ± 19 Ma | Kröner et al. (2000) |
| 99 | Quartz porphyry sill | 2873 ± 5 Ma | Gutzmer et al. (1999) |
| 100 | Post-Kraaipan granodiorite | 2879 ± 3 Ma | Poujol et al. (2000) |
| 101 | Granodioritic gneiss | 2880 ± 10 Ma  | Laurent and Zeh (2015) |
| 102 | Trondhjemite gneiss | 2881 ± 7 Ma  | Laurent and Zeh (2015) |
| 103 | Skalkseput granite | 2884 ± 22 Ma | Cornell et al. (2018) |
| 104 | Makoppa monzogranite | 2886 +3/-2 Ma | Anhaeusser and Poujol (2004) |
| 105 | Amalia intrusive granite | 2889 ± 2 Ma | Anhaeusser and Walraven (1997) |
| 106 | Granitoids SW margin of Kaapvaal Craton | 2900 Ma to 2910 Ma | Cornell et al. (2018) |
| 107 | Granitoids, Amalia Greenstone Belt | 2913 Ma and 2915 Ma | Poujol et al. (2002) |
| 108 | Maranda granite | 2901 ± 20 Ma | Poujol (2001) |
| 109 | Post-Kraaipan granodiorite | 2913 ± 15 Ma | Poujol et al. (2000) |
| 110 | Crown lavas | 2914 ± 8 Ma | Armstrong et al. (1991) |
| 111 | Schweizer-Reneke granite | 2927 ± 23/6 Ma | Robb et al. (1992) |
| 112 | Mabuasehube granitoid | 2928 ± 4 Ma | Kamo et al. (1995) |
| 113 | Nhlango gneiss | 2929 ± 5 Ma | Maphalala and Kröner (1993) |
| 114 | Ysterberg quartz porphyry | 2929 ± 26 Ma | Kröner et al. (2000) |
| 115 | Meriri gneiss | 2931 ± 8 Ma | Zeh et al. (2009) |
| 116 | Tonalite, Amalia Greenstone Belt | 2939 ± 45 Ma | Poujol et al. (2002) |
| 117 | Draghoender tonalite | 2940 ± 6 Ma | Cornell et al. (2018) |
| 118 | Turfloop Batholith gneiss | 2941 ± 6 Ma | Laurent and Zeh (2015) |
| 119 | Amphibolite | 2942 ± 8 Ma | Laurent and Zeh (2015) |
| 120 | Granodiorite gneiss | 2945 ± 4 Ma | Laurent and Zeh (2015) |
| 121 | Draghoender tonalite | 2946 ± 9 Ma | Cornell et al. (2018) |
| 122 | Halfway House granite | 2947 ± 57 Ma | Poujol and Anhaeusser (2001) |
| 123 | Trondhjemitic gneiss | 2953 ± 13 Ma | Laurent and Zeh (2015) |
| 124 | Groot Letaba gneiss | 2953 ± 68 Ma | Kröner et al. (2000) |
| 125 | Pre-Pietersburg granitoid | 2958 ± 2 Ma | De Wit et al. (1993)  |
| 126 | Rubbervale Formation volcanics | 2966 ± 7 Ma | Zeh et al. (2013) |
| 127 | Rubbervale Formation volcanics | 2972 ± 7 Ma | Zeh et al. (2013) |
| 128 | Rubbervale Formation | 2969 ± 20 Ma | Poujol (2001) |
| 129 | Discovery granite | 2969 ± 17 Ma | Poujol (2001) |
| 130 | Matok granite | 2671 ± 2 Ma | Barton Jr et al. (1992) |
| 131 | Agatha Formation, Ntambo Member | 2977 ± 5 Ma | Nhleko (2003) |
| 132 | Ngwane gneiss | 2981 ± 30 Ma | Kröner et al. (1991) |
| 133 | Witwatersrand Supergroup | 2849 to 2985 Ma | Kositcin and Krapež (2004) |
| 134 | Vaalpenskraal trondhjemite gneiss | 3013 ± 11 Ma | Anhaeusser and Poujol (2004) |
| 135 | Vaalpenskraal trondhjemite gneiss  | 3034 ± 64 Ma | Anhaeusser and Poujol (2004) |
| 136 | Cunningmore pluton | 3049 ± 8 Ma | Zeh et al. (2009) |
| 137 | Pre-Witwatersrand Supergroup basement | 3063 Ma to 3064 Ma | Frimmel et al. (2009) |
| 138 | Sincunusa granite | 3067 ± 12 Ma | Zeh et al. (2011) |
| 139 | Annandagstoppane granite, Grunehogna Terrane | 3067 ±8 Ma | Marschall et al. (2013) |
| 140 | Dominion Group volcanics | 3074 ± 6 Ma | Armstrong et al. (1991) |
| 141 | Mpuluzi batholith | 3082 ± 6 Ma | Zeh et al. (2009) |
| 142 | Madibe Greenstone Belt | 3082.5 ± 5.9 Ma | Poujol et al. (2008) |
| 143 | Boesmanskop syenite | 3097 ± 11Ma  | Zeh et al. (2009) |
| 144 | Pigg’s Peak pluton | 3099 ± 8 Ma | Zeh et al. (2009) |
| 145 | Salisbury granite | 3100 ± 14 Ma | Zeh et al. (2009) |
| 146 | Mpuluzi batholith | 3167 Ma to 3100 Ma | Murphy (2015) |
| 147 | Sand River gneiss | 3181 ± 44 Ma to 3293 ± 2 Ma | Kröner et al. (1991) |
| 148 | Dalmein pluton | 3192 ± 27 Ma | Zeh et al. (2009) |
| 149 | Pietersburg block gneiss | 3213 ± 72 Ma | Vezinet (2017) |
| 150 | Mahamba gneiss  | 3217 ± 8 Ma | Zeh et al. (2011) |
| 151 | Stentor pluton | 3218 ± 7 Ma | Zeh et al. (2009) |
| 152 | Piggs Peak batholith | 3221 ± 12 Ma | Zeh et al. (2011) |
| 153 | Onverwacht quartz porphyry | 3229 ± 4 Ma | Kamo and Davis (1994) |
| 154 | Pigg’s Peak batholith | 3230 ± 9 Ma | Zeh et al. (2011) |
| 155 | Kaap Valley pluton | 3231 ± 9 Ma | Zeh et al. (2009) |
| 156 | Granitoid, basement to Pongola Supergroup | 3234 ± 5 Ma | Reinhardt et al. (2015) |
| 157 | Fig Tree dacite | 3237 ± 3 Ma | Byerly et al. (1996) |
| 158 | Ancient Gneiss Complex | 3237 ± 7 Ma | Zeh et al. (2011) |
| 159 | Ngwane gneiss | 3238 ± 8 Ma | Zeh et al. (2009) |
| 160 | Nelshoogte pluton | 3238 ± 8 Ma | Zeh et al. (2009) |
| 161 | Dorothy gneiss | 3239 ± 2 Ma | Kröner et al. (1998) |
| 162 | Nkandla granite | 3254 ± 8 Ma | Hicks et al. (2015) |
| 163 | Granitoid basement to Pongola Supergroup | 3255 Ma | Reinhardt et al. (2015) |
| 164 | Goudplaats gneiss - rims | 3280 ± 7 Ma | Laurent and Zeh (2015) |
| 165 | Mendon volcanics | 3298 ± 3 Ma | Byerly et al. (1996) |
| 166 | Ancient Gneiss Complex  | 3323 ±7 Ma | Zeh et al. (2011) |
| 167 | Goudplaats gneiss - cores | 3343 ± 7 Ma | Laurent and Zeh (2015) |
| 168 | Komati Formation gabbro | 3352 ± 6 Ma | Kamo and Davis (1994) |

References for Supplementary Appendix IV Table 2

Altermann, W. and Nelson, D.R., 1998. Sedimentation rates, basin analysis and regional correlations of three Neoarchaean and Palaeoproterozoic sub-basins of the Kaapvaal craton as inferred from precise U–Pb zircon ages from volcaniclastic sediments. Sedimentary Geology*,* 120, 1-4, 225-256.

Andersen, T., Elburg, M.A. and Van Niekerk, H.S., 2019. Detrital zircon in sandstones from the Palaeoproterozoic Waterberg and Nylstroom basins, South Africa: Provenance and recycling. South African Journal of Geology*,* 122, 1, 79-96.

Anhaeusser, C.R. and Poujol, M., 2004. Petrological, geochemical and U-Pb isotopic studies of Archaean granitoid rocks of the Makoppa Dome, northwest Limpopo Province, South Africa. South African Journal of Geology*,* 107, 521-544.

Anhaeusser, C.R. and Walraven, F., 1997. Polyphase crustal evolution of the Archaean Kraaipan granite-greenstone terrane, Kaapvaal Craton, South Africa. Information Circular - University of the Witwatersrand, Economic Geology Research Unit*,* 2, 313.

Anhaeusser, C.R. and Walraven, F., 1999. Episodic granitoid emplacement in the western Kaapvaal Craton: evidence from the Archaean Kraaipan granite-greenstone terrane, South Africa. Journal of African Earth Sciences*,* 28, 289-309.

Armstrong, R.A., Compston, W., Retief, E.A., Williams, I.S. and Welke, H.J., 1991. Zircon ion microprobe studies bearing on the age and evolution of the Witwatersrand triad. Precambrian Research*,* 53, 2, 243-266.

Barton, J.M., Blignaut, E., Salnikova, E.B. and Kotov, A.B., 1995. The stratigraphical position of the Buffelsfontein Group based on field relationships and chemical and geochronological data. South African Journal of Geology*,* 98, 4, 386-392.

Barton, J.M., Holzer, L., Doig, R., Kramers, J.D. and Nyfeler, D., 1994. Discrete metamorphic events in the Limpopo Belt, Southern Africa; implications for the application of P-T paths in complex metamorphic terrains. Geology*,* 22, 1035-1038.

Barton Jr, J.M., Doig, R., Smith, C.B., Bohlender, F. and Van Reenen, D.D., 1992. Isotopic and REE characteristics of the intrusive charnoenderbite and enderbite geographically associated with the Matok Pluton, Limpopo Belt, southern Africa. Precambrian Research*,* 55, 451-467.

Byerly, G.R., Kröner, A., Lowe, D.R., Todt, W. and Walsh, M.M., 1996. Prolonged magmatism and time constraints for sediment deposition in the early Archean Barberton greenstone belt: evidence from the Upper Onverwacht and Fig Tree groups. Precambrian Research*,* 78, 125-138.

Cornell, D.H., Minnaar, H., Frei, D. and Kristoffersen, M., 2018. Precise microbeam dating defines three Archaean granitoid suites at the southwestern margin of the Kaapvaal Craton. Precambrian Research*,* 304, 21-38.

Cornell, D.H., Zack, T., Andersen, T., Corfu, F., Frei, D. and Van Schijndel, V., 2016. Th-U-Pb zircon geochronology of the Palaeoproterozoic Hartley Formation porphyry by six methods, with age uncertainty approaching 1 Ma. South African Journal of Geology*,* 119, 3, 473-494.

de Kock, M.O., 2006. Paleomagnetism of the lower two unconformity-bounded sequences of the Waterberg Group, South Africa: Towards a better-defined apparent polar wander path for the Paleoproterozoic Kaapvaal Craton. South African Journal of Geology*,* 109, 1-2, 157-182.

De Wit, M.J., Armstrong, R.A., Kamo, S.L. and Erlank, A.J., 1993. Gold-Bearing Sediments In The Pietersburg Greenstone Belt: Age Equivalents of the Witwatersrand Supergroup Sediments, South Africa. Economic Geology*,* 88, 1242-1252.

Dorland, H., 2004. Provenance ages and timing of sedimentation of selected Neoarchean and Paleoproterozoic successions on the Kaapvaal Craton. (Unpublished PhD Thesis). University of Johannesburg, 326pp.

Frimmel, H.E., Zeh, A., Lehrmann, B., Hallbauer, D. and Frank, W., 2009. Geochemical and Geochronological Constraints on the Nature of the Immediate Basement next to the Mesoarchaean Auriferous Witwatersrand Basin, South Africa. Journal of Petrology*,* 50, 12, 2187-2220.

Gibson, R.L., Armstrong, R.A. and Reimold, W.U., 1997. The age and thermal evolution of the Vredefort impact structure; a single-grain U-Pb zircon study. Geochimica et Cosmochimica Acta*,* 61, 7, 1531-1540.

Grobler, N.J. and Walraven, F., 1993. Geochronology of Gaborone Granite Complex extensions in the area north of Mafikeng, South Africa. Chemical Geology*,* 105, 319-337.

Gutzmer, J., Nhleko, N., Beukes, N.J., Pickard, A. and Barley, M.E., 1999. Geochemistry and ion microprobe (SHRIMP) age of a quartz porphyry sill in the Mozaan Group of the Pongola Supergroup: implications for the Pongola and Witwatersrand Supergroups. South African Journal of Geology*,* 102, 139-146.

Hanson, R.E., Gose, W.A., Crowley, J.L., Ramezani, J., Bowring, S.A., Bullen, D.S., Hall, R.P., Pancake, J.A. and Mukwakwami, J., 2004. Paleoproterozoic intraplate magmatism and basin development on the Kaapvaal Craton: Age, paleomagnetism and geochemistry of ~1.93 to ~1.87 Ga post-Waterberg dolerites. South African Journal of Geology*,* 107, 233-254.

Henderson, D.R., Long, L.E. and Barton, J.M., 2000. Isotopic ages and chemical and isotopic composition of the Archaean Turfloop Batholith, Pietersburg granite—greenstone terrane, Kaapvaal Craton, South Africa. South African Journal of Geology*,* 103, 1, 38-46.

Hicks, N., Elburg, M. and Andersen, T., 2015. U-Pb and Hf Isotope Constraints for Emplacement of the Nkandla Granite, Southeastern Kaapvaal Craton, South Africa. South African Journal of Geology*,* 118, 2, 119-128.

Hilliard, P., 1999. Structural evolution and tectonostratigraphy of the Kheis Orogen and its relationship to the south western margin of the Kaapvaal Craton (Unpublished PhD thesis). University of Durban-Westville, 227pp.

Holzer, L., Barton, J.M., Paya, B.K. and Kramers, J.D., 1999. Tectonothermal history of the western part of the Limpopo Belt: tectonic models and new perspectives. Journal of African Earth Sciences*,* 28, 2, 383-402.

Jolley, S.J., Freeman, S.R., Barnicoat, A.C., Phillips, G.M., Knipe, R.J., Pather, A., Fox, N.P.C., Strydom, D., Birch, M.T.G., Henderson, I.H.C. and Rowland, T.W., 2005. Structural controls on Witwatersrand Gold mineralization. Journal of Structural Geology*,* 26, 6-7, 1067-1086.

Kamo, S.L. and Davis, D.W., 1994. Reassessment of Archean crustal development in the Barberton Mountain Land, South Africa, based on U-Pb dating. Tectonics*,* 13, 1, 165-192.

Kamo, S.L., Key, R.M. and Daniels, L.R.M., 1995. New evidence for Neoarchean, hydrothermally altered granites in south-central Botswana. Journal of the Geological Society of London*,* 152, 747-750.

Kampmann, T.C., Gumsley, A.P., de Kock, M.O. and Söderlund, U., 2015. U–Pb geochronology and paleomagnetism of the Westerberg Sill Suite, Kaapvaal Craton – Support for a coherent Kaapvaal–Pilbara Block (Vaalbara) into the Paleoproterozoic? Precambrian Research*,* 269, 58-72.

Kositcin, N. and Krapež, B., 2004. Relationship between detrital zircon age-spectra and the tectonic evolution of the Late Archaean Witwatersrand Basin, South Africa. Precambrian Research*,* 129, 1-2, 141-168.

Kröner, A., Jaeckel, P. and Brandl, G., 2000. Single zircon ages for felsic to intermediate rocks from the Pietersburg and Giyani greenstone belts and bordering granitoid orthogneisses, northern Kaapvaal Craton, South Africa. Journal of African Earth Sciences*,* 30, 4, 773-793.

Kröner, A., Jaeckel, P., Brandl, G., Nemchin, A.A. and Pidgeon, R.T., 1999. Single zircon ages for granitoid gneisses in the Central Zone of the Limpopo Belt, Southern Africa and geodynamic significance. Precambrian Research*,* 93, 299-337.

Kröner, A., Jaeckel, P., Hofmann, A., Nemchin, A.A. and Brandl, G., 1998. Field relationships and age of supracrustal Beit Bridge Complex and associated granitoid gneisses in the Central Zone of the Limpopo Belt, South Africa. South African Journal of Geology*,* 101, 3, 201-213.

Kröner, A., Wendt, J.L., Tegmeyer, A.R., Milisenda, C. and Compston, W. 1991. Geochronology of the Ancient Gneiss Complex, Swaziland, and implications for crustal evolution In: Ashwal, L.D., Traverse through two cratons and an orogen; excursion guidebook and review articles for a field workshop through selected Archaean terranes of Swaziland, South Africa, Zimbabwe. Johannesburg: Univeristy of the Witwatersrand. 8-31

Laurent, O. and Zeh, A., 2015. A linear Hf isotope-age array despite different granitoid sources and complex Archean geodynamics: Example from the Pietersburg block (South Africa). Earth and Planetary Science Letters*,* 430, 326-338.

Layer, P.W., Kröner, A., McWilliams, M. and York, D., 1991. Elements of the Archean thermal history and apparent polar wander of the eastern Kaapvaal Craton, Swaziland, from single grain dating and paleomagnetism. Earth and Planetary Science Letters*,* 93, 23-34.

Magwaza, B.N., 2019. Isotopic resetting of zircons: Influence of age, temperature and chemical environment (MSc). 269pp.

Maier, W.D., Peltonen, P., Grantham, G. and Mänttäri, I., 2003. A new 1.9 Ga age for the Trompsburg Intrusion, South Africa. Earth and Planetary Science Letters*,* 212, 3, 351-360.

Majaule, T., Hanson, R.E., Singletary, S.J., Martin, M.W. and Bowring, S.A., 1994. The Magondi Belt in Northeast Botswana; regional relations and new geochronological data from the Sua Pan area. Journal of African Earth Sciences*,* 32, 2, 257-267.

Maphalala, R.M. and Kröner, A., 1993, Pb-Pb single zircon ages for the younger Archaean granitoids of Swaziland, southern Africa, 16th Colloqium of African Geology.

Marschall, H.R., Hawkesworth, C.J. and Leat, P.T., 2013. Mesoproterozoic subduction under the eastern edge of the Kalahari-Grunehogna Craton preceding Rodinia assembly: The Ritscherflya detrital zircon record, Ahlmannryggen (Dronning Maud Land, Antarctica). Precambrian Research*,* 236, 31-45.

McCourt, S. and Armstrong, R.A., 1998. SHRIMP U-Pb zircon geochronology of granites from the central zone, Limpopo Belt, southern Africa; implications for the age of the Limpopo Orogeny. South African Journal of Geology*,* 101, 4, 329-338.

McCourt, S., Hilliard, P. and Armstrong, R.A. 2000. SHRIMP U-Pb zircon geochronology of granitoids from the western margin of the Kaapvaal Craton; implications for crustal evolution in the Neoarchean. In *Geocongress 2000; a new millennium on ancient crust; 27th Earth science congress of the Geological Society of South Africa,* eds. Kisters, A.F.M. and Thomas, R.J., 48. Johannesburg: Journal of African Earth Sciences.

Moore, M., Davis, D.W., Robb, L.J., Jackson, M.C. and Grobler, D.F., 1993. Archean rapakivi granite-anorthosite-rhyolite complex in the Witwatersrand Basin hinterland, Southern Africa. Geology*,* 21, 1031-1034.

Munyanyiwa, H., Kröner, A. and Jaeckel, P., 1995. U-Pb and Pb-Pb single zircon ages from the Magondi mobile belt, northwest Zimbabwe. South African Journal of Geology*,* 98, 52-57.

Murphy, R.C.L., 2015. Stabilising a craton: the origin and emplacement of the 3.1 Ga Mpuluzi Batholith (Unpublished PhD Thesis). Macquarie University, 489pp.

Nhleko, N., 2003. The Pongola Supergroup in Swaziland (Unpublished PhD Thesis). University of Johannesburg, 299pp.

Pickard, A., 2003. SHRIMP U-Pb zircon ages for the Palaeoproterozoic Kuruman Iron Formation, Northern Cape Province, South Africa: Evidence for simultaneous BIF deposition on Kaapvaal and Pilbara Cratons. Precambrian Research*,* 125, 3-4, 275-315.

Poujol, M., 2001. U-Pb isotopic evidence for episodic granitoid emplacement in the Murchison greenstone belt, South Africa. Journal of African Earth Sciences*,* 33, 1, 155-163.

Poujol, M. and Anhaeusser, C.R., 2001. The Johannesburg Dome, South Africa: New single zircon U-Pb isotopic evidence for early Archaean granite-greenstone development within the central Kaapvaal Craton. Precambrian Research*,* 108, 139-157.

Poujol, M., Anhaeusser, C.R. and Armstrong, R.A. 2000. Episodic Archaean granitoid emplacement in the Amalia-Kraaipan Terrane, South Africa; new evidence from single zircon U-Pb geochronology with implications for the age of the western Kaapvaal Craton.Johannesburg: University of the Witwatersrand.

Poujol, M., Anhaeusser, C.R. and Armstrong, R.A., 2002. Episodic granitoid emplacement in the Archaean Amalia–Kraaipan terrane, South Africa: confirmation from single zircon U–Pb geochronology. Journal of African Earth Sciences*,* 35, 147-161.

Poujol, M., Hirner, A.J., Armstrong, R.A. and Anhaeusser, C.R., 2008. U-Pb SHRIMP data for the Madibe greenstone belt: implications for crustal growth on the western margin of the Kaapvaal Craton, South Africa. South African Journal of Geology*,* 111, 1, 67-78.

Poujol, M., Kiefer, R., Robb, L.J., Anhaeusser, C.R. and Armstrong, R.A., 2005. New U-Pb data on zircons from the Amalia greenstone belt Southern Africa: insights into the Neoarchaean evolution of the Kaapvaal Craton. South African Journal of Geology*,* 108, 317-332.

Poujol, M. and Robb, L.J., 1999. New U-Pb zircon ages on gneisses and pegmatite from south of the Murchison greenstone belt, South Africa. South African Journal of Geology*,* 102, 2, 93-97.

Reimold, W.U., Armstrong, R.A. and Koeberi, C., 2002. A deep drill core from the Morokweng impact structure, South Africa; petrography, geochemistry, and constraints on the crater size. Earth and Planetary Science Letters*,* 201, 1, 221-232.

Reinhardt, J., Elburg, M.A. and Andersen, T., 2015. Zircon U-Pb Age Data and Hf Isotopic Signature of Kaapvaal Basement Granitoids from the Archaean White Mfolozi Inlier, Northern Kwazulu-Natal. South African Journal of Geology*,* 118, 4, 473-488.

Rigby, M.J. and Armstrong, R.A., 2011. SHRIMP dating of titanite from metasyenites in the Central Zone of the Limpopo Belt, South Africa. Journal of African Earth Sciences*,* 59, 1, 149-154.

Robb, L.J., Davis, D.W., Kamo, S.L. and Meyer, F.M., 1992. Ages of hydrothermally altered granites adjacent to the Witwatersrand Basin; implications for the origin of Au and U. Nature*,* 357, 6380, 677-680.

Schmitz, M.D. and Bowring, S.A., 2000. The significance of U-Pb zircon dates in lower crustal xenoliths from the southwestern margin of the Kaapvaal Craton, Southern Africa. Chemical Geology*,* 172, 59-76.

Sibiya, V.B.B., 1998. The Gaborone granite complex, Botswana, Southern Africa; an atypical rapakivi granite-massif anorthosite association (Unpublished Phd Thesis). Vrije Universiteit Amsterdam, 449pp.

Vezinet, A., 2017. Differentiation and stabilisation of the Archean continental crust, the example of the northern edge of the Kaapvaal Craton, South Africa (Unpublished PhD Thesis). University of Stellenbosch, 334pp.

Walraven, F., Grobler, D.F. and Key, R.M., 1996. Age equivalence of the Plantation Porphyry and the Kanye Volcanic Formation, southeastern Botswana. South African Journal of Geology*,* 99, 1, 23-31.

Walraven, F. and Hattingh, E., 1993. Geochronology of the Nebo Granite, Bushveld Complex. South African Journal of Geology*,* 96, 1/2,

Walraven, F. and Martini, J., 1995. Zircon Pb-evaporation age determinations of the Oak Tree Formation, Chuniespoort Group, Transvaal Sequence: Implications for Transvaal-Griqualand West basin correlations. South African Journal of Geology*,* 98, 1, 58-67.

Zeh, A., Gerdes, A. and Barton, J.M., 2009. Archean Accretion and Crustal Evolution of the Kalahari Craton—the Zircon Age and Hf Isotope Record of Granitic Rocks from Barberton/Swaziland to the Francistown Arc. Journal of Petrology*,* 50, 5, 933-966.

Zeh, A., Gerdes, A. and Heubeck, C., 2013. U–Pb and Hf isotope data of detrital zircons from the Barberton Greenstone Belt: constraints on provenance and Archaean crustal evolution. Journal of the Geological Society*,* 170, 1, 215-223.

Zeh, A., Gerdes, A. and Millonig, L., 2011. Hafnium isotope record of the Ancient Gneiss Complex, Swaziland, southern Africa: evidence for Archaean crust–mantle formation and crust reworking between 3.66 and 2.73 Ga. Journal of the Geological Society of London*,* 168, 953-964.

Zeh, A., Ovtcharova, M., Wilson, A.H. and Schaltegger, U., 2015. The Bushveld Complex was emplaced and cooled in less than one million years – results of zirconology, and geotectonic implications. Earth and Planetary Science Letters*,* 418, 103-114.

Table 2: Stratigraphic unit, age and reference for U-Pb zircon age data used to determine the possible source areas for the Korannaland Group.

| **No**  | **Stratigraphic unit** | **Age** | **Reference** |
| --- | --- | --- | --- |
| 1 | Banke granodiorite | 1033 Ma crystallisation  | Macey et al. (2018) |
| 2 | Little Namaqualand Suite, Modderfontein orthogneiss | Metamorphic 1032 ± 12Ma | Robb et al. (1999) |
| 3 | Spektakel Suite | 1033 to 1097 Ma | Macey et al. (2018) |
| 4 | Spektakel Suite, Vaalputs megacrystic granite | Emplacement 1056 ±1 0Ma | Ashwal et al. (1997) |
| 5 | Koperberg Suite, diorite | Magmatic 1057 ±8 Ma | Robb et al. (1999) |
| 6 | Jakkalshoek granite | 1062 Ma crystallisation | Macey et al. (2018) |
| 7 | Spektakel Suite, Rietberg granite | Magmatic 1058 ± 30 Ma | Robb et al. (1999) |
| 8 | Little Namaqualand Suite, granulite | Metamorphic 1063 ± 16 Ma | Robb et al. (1999) |
| 9 | Spektakel Suite, Concordia granite | Magmatic 1064 ± 31 Ma | Robb et al. (1999) |
| 10 | Koperberg Suite | 1069 ± 44 Ma | Clifford et al. (2004) |
| 11 | Friersdale charnockite, Keimoes Suite | 1078 ± 10 Ma  | Cornell et al. (2012) |
| 12 | Keimoes Suite | 1078 to 1110 Ma | Bailie et al. (2017) |
| 13 | Koras Group maximum deposition age | 1090 Ma | Fitzpatrick (2017) |
| 14 | Leeuwdraai Formation, Koras Group | 1092 ± 9 Ma | Pettersson et al. (2007) |
| 15 | Little Namaqualand gneiss | 1109 ± 20 Ma | Raith et al. (2003) |
| 16 | Little Namaqualand gneiss (Stoffelkop) | 1111 ± 21 Ma | Raith et al. (2003) |
| 17 | Spektakel Suite, Vaalputs gneiss | Emplacement 1137 ± 17 Ma | Ashwal et al. (1997) |
| 18 | Jannelsepan Formation lava | 1142 ± 11 Ma | Bailie (2008) |
| 19 | Jannelsepan Formation migmatite | 1165 ± 10 Ma | Pettersson et al. (2007) |
| 20 | Korannaland Group, Kokerberg granite-gneiss | 1166 ± 15 Ma | van Niekerk et al. (2020) |
| 21 | Little Namaqualand Suite, granulite | Emplacement 1168 ± 9 Ma | Robb et al. (1999) |
| 22 | Koras Group, Swartkopsleegte quartz porphyry | 1172 ± 6 Ma | Gutzmer et al. (2000) |
| 23 | Swartkopsleegte Formation, Koras Group | 1173 ± 12 Ma | Pettersson (2008) |
| 24 | Spektakel Suite, Kweekfontien granite | 1186 ± 15 Ma | Clifford et al. (2004) |
| 25 | Little Namaqualand Suite, Modderfontein orthogneiss | Magmatic 1192 ± 12 Ma | Robb et al. (1999) |
| 26 | Koperberg Suite, anorthosite | Magmatic 1202 ± 25 Ma | Robb et al. (1999) |
| 27 | Spektakel Suite, Concordia granite | 1206 ± 16 Ma | Clifford et al. (2004) |
| 28 | Little Namaqualand Suite | 1210 to 1190 Ma | Macey et al. (2018) |
| 29 | Little Namaqualand Suite, Nababeep gneiss | Magmatic 1211 ± 11 Ma | Robb et al. (1999) |
| 30 | Areachap Terrane | 1240 to 1300 Ma | Bailie et al. (2010a) |
| 31 | Jannelsepan Formation volcanic rocks | 1261 ± 18 Ma | Bailie (2008) |
| 32 | Jannelsepan Formation volcanic rocks | 1275 ± 7 Ma | Cornell and Pettersson (2007) |
| 33 | Copperton Formation, Smouspan gneiss | 1285 ± 14 Ma | Cornell et al. (1990) |
| 34 | Leerkrans Formation | 1289 ± 9 Ma | Bailie et al. (2011a) |
| 35 | Wilgenhoutsdrif lava | 1290 ± 8 Ma | Moen and Armstrong (2008) |
| 26 | Kalkwerf gneiss | 1293 ± 9 Ma | Moen and Armstrong (2008) |
| 37 | Bushmanland Group deposition | 1650 and 2000 Ma | Bailie et al. (2007) |
| 38 | Gladkop Suite, Brandewynsbank gneiss | Magmatic 1822 ± 36 Ma | Robb et al. (1999) |
| 39 | Richtersveld Magmatic arc | 1910 to 1860 Ma | Macey et al. (2017) |

References for Supplementary Appendix IV Table 2

Ashwal, L.D., Andreoli, M.A.G., Page, T., Armstrong, R.A. and Tucker, R.D., 1997, Geology and geochronology of high temperature granultes, Vaalputs area, central Namaqualand, South Africa., TDOGS XIIIth anniversary conference.

Bailie, R., Armstrong, R. and Reid, D., 2007. The Bushmanland Group supracrustal succession, Aggeneys, Bushmanland, South Africa: Provenance, age of deposition and metamorphism. South African Journal of Geology*,* 110, 1, 59-86.

Bailie, R., Gutzmer, J. and Rajesh, H.M., 2010. Lithogeochemistry as a tracer of the tectonic setting, lateral integrity and mineralization of a highly metamorphosed Mesoproterozoic volcanic arc sequence on the eastern margin of the Namaqua Province, South Africa. Lithos*,* 119, 3-4, 345-362.

Bailie, R., Gutzmer, J. and Rajesh, H.M., 2011. Petrography, Geochemistry and Geochronology of the Metavolcanic Rocks of the Mesoproterozoic Leerkrans Formation, Wilgenhoutsdrif Group, South Africa - Back-Arc Basin to the Areachap Volcanic Arc. South African Journal of Geology*,* 114, 2, 167-194.

Bailie, R.H., 2008. Mesoproterozoic Volcanism, Metallogenesis And Tectonic Evolution Along The Western Margin Of The Kaapvaal Craton (Unpublished PhD thesis). University of Johannesburg, 228pp.

Bailie, R.H., Macey, P.H., Nethenzheni, S., Frei, D. and le Roux, P., 2017. The Keimoes Suite redefined: The geochronological and geochemical characteristics of the ferroan granites of the eastern Namaqua Sector, Mesoproterozoic Namaqua-Natal Metamorphic Province, southern Africa. Journal of African Earth Sciences*,* 134, 737-765.

Clifford, T.N., Barton, E.S., Stern, R.A. and Duchesne, J.-C., 2004. U-Pb Zircon Calendar for Namaquan (Grenville) Crustal Events in the Granulite-facies Terrane of the O'okiep Copper District of South Africa. Journal of Petrology*,* 45, 4, 669-691.

Cornell, D.H., Kröner, A., Humphreys, H. and Griffin, G., 1990. Age of the polymetamorphosed Copperton Formation, Namaqua-Natal Province, determined by single grain zircon Pb-Pb dating. South African Journal of Geology*,* 93, 5/6, 709-716.

Cornell, D.H. and Pettersson, Å., 2007. Ion probe zircon dating of metasediments from the Areachap and Kakamas Terranes, Namaqua-Natal Province and the stratigraphic integrity of the Areachap Group. South African Journal of Geology*,* 110, 575-584.

Cornell, D.H., Pettersson, Å. and Simonsen, S.L., 2012. Zircon U-Pb Emplacement and Nd-Hf Crustal Residence Ages of the Straussburg Granite and Friersdale Charnockite in the Namaqua-Natal Province, South Africa. South African Journal of Geology*,* 115, 4, 465-484.

Fitzpatrick, S.J., 2017. Implications of paleomagnetism and detrital zircon provenance of the Koras Group of the Kalahari Craton within the Supercontinent Rodinia (Unpublished M.Sc. Dissertation). University of Johannesburg, 140pp.

Gutzmer, J., Beukes, N.J., Pickard, A. and Barley, M.E., 2000. 1170 Ma SHRIMP age for Koras Group bimodal volcanism, Northern Cape Province. South African Journal of Geology*,* 103, 1, 32-37.

Macey, P.H., Bailie, R.H., Miller, J.A., Thomas, R.J., de Beer, C., Frei, D. and le Roux, P.J., 2018. Implications of the distribution, age and origins of the granites of the Mesoproterozoic Spektakel Suite for the timing of the Namaqua Orogeny in the Bushmanland Domain of the Namaqua-Natal Metamorphic Province, South Africa. Precambrian Research*,* 312, 68-98.

Macey, P.H., Thomas, R.J., Minnaar, H.M., Gresse, P.G., Lambert, C.W., Groenewald, C.A., Miller, J.A., Indongo, J., Angombe, M., Shifotoka, G., Frei, D., Diener, J.F.A., Kisters, A.F.M., Dhansay, T., Smith, H., Doggart, S., Le Roux, P., Hartnady, M.I. and Tinguely, C., 2017. Origin and evolution of the ∼1.9 Ga Richtersveld Magmatic Arc, SW Africa. Precambrian Research*,* 292, 417-451.

Moen, H.F.G. and Armstrong, R.A., 2008. New age constraints on the tectogenesis of the Kheis Subprovince and the evolution of the eastern Namaqua Province. South African Journal of Geology*,* 111, 1, 79-88.

Pettersson, Å., 2008. Mesoproterozoic crustal evolution in Southern Africa (Party publsihed Doctoral thesis). Gothenburg University, 28pp.

Pettersson, Å., Cornell, D.H., Moen, H.F.G., Reddy, S. and Evans, D., 2007. Ion-probe dating of 1.2Ga collision and crustal architecture in the Namaqua-Natal Province of southern Africa. Precambrian Research*,* 158, 1-2, 79-92.

Raith, J.G., Cornell, D.H., Frimmel, H.E. and De Beer, C.H., 2003. New insights into the geology of the Namaqua tectonic province, South Africa, from ion probe dating of detrital and metamorphic zircon. The Journal of Geology*,* 111, 3, 347-366.

Robb, L., Armstrong, R.A. and Waters, D.J., 1999. The History of Granulite-Facies Metamorphism and Crustal Growth from Single Zircon U-Pb Geochronology: Namaqualand, South Africa. Journal of Petrology*,* 40, 12, 1747-1770.

van Niekerk, H.S., Armstrong, R. and Vasconcelos, P., 2020. The Grenvillian assembly of Rodinia: Timing of accretion on the western margin of the Kalahari (Kaapvaal) Craton. South African Journal of Geology*,* 123, 4, 441-464.