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## THE SR-ISOTOPE COMPOSITIONS OF CLINOPYROXENE MEGACRYSTS DETERMINED BY ICP-MS-LA FROM LOCALITIES ACROSS THE KAAPVAAL CRATON THROUGH THE AGES

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The  $^{87}\text{Sr}/^{86}\text{Sr}$  -isotope composition of clinopyroxene megacrysts were determined by ICP-MS-LA on ca.150 samples from 15 kimberlite localities across the Kaapvaal craton. Kimberlites from different ages, kimberlite type (Group I and Group II) and tectonic settings (on craton and off craton) are included. Samples from each locality cover the full compositional range that was previously determined by electron probe analyses. Fragments of megacrysts were analysed as samples embedded in epoxy mounts.

ma.), Lethlakane (90 ma.), Kao (90 ma.), Thaba Putsoa (90 ma.) and Nouzees 4 (60 ma.) as shown in Fig. 1.

All localities are classified as Group I with the exception of Swartruggens and Kalkput that are classified as Group II. The Zeekoegat, Uintjesberg, Nouzees and Kalkput kimberlites are located off-craton while the remainder of kimberlites is located on-craton. A locality plot is shown in Fig. 1.

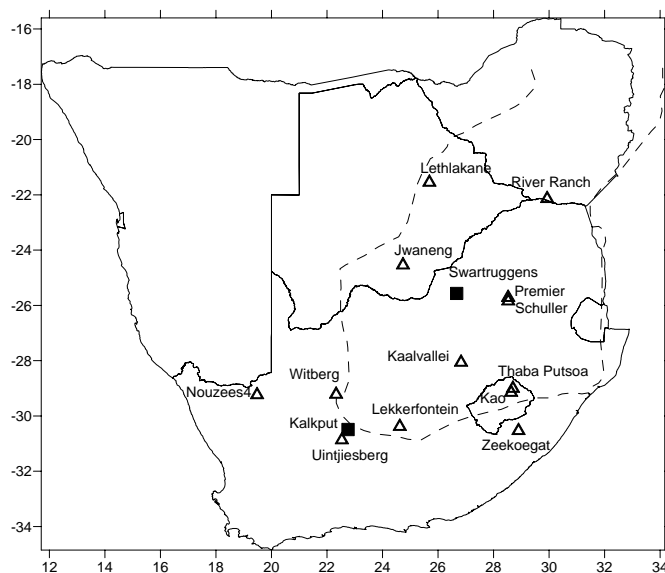


Fig. 1 Map showing the locality positions of the kimberlites for clinopyroxene megacrysts in this study. The localities of the Group II kimberlites are shown as solid black squares. The position of the craton margin is shown as a broken line.

The kimberlites represented in this study are Premier (1200 ma.), Schuller (1200 ma.), River Ranch (500 ma.), Jwaneng (250 ma.), Zeekoegat (150 ma.), Swartruggens, (145 ma.), Kalkput (115 ma.), Witberg (108 ma.), Uintjesberg (100

The clinopyroxene megacrysts from specific Group I and Group II kimberlite localities display ranges of  $^{87}\text{Sr}/^{86}\text{Sr}$  values that are larger than the analytical errors associated with individual analyses.

The mean value for  $^{87}\text{Sr}/^{86}\text{Sr}$  ratios from individual on craton Group I kimberlites were found to be generally lower than those from off craton localities although an overlap of values are found.

The data could indicate that clinopyroxene megacrysts from a specific locality do not necessarily represent a single point  $^{87}\text{Sr}/^{86}\text{Sr}$  source. The range of values found at single localities may record variable source heterogeneities or record interaction between the source magma and surrounding lithospheric material.

The  $^{87}\text{Sr}/^{86}\text{Sr}$  ratios of clinopyroxene megacrysts from Group I and Group II kimberlites, in this study, are distinct as shown in Fig. 2. Samples from Group I kimberlites have values between 0.70209 and 0.70442 whereas those from the Group II kimberlites have values between 0.70718 and 0.70792. The difference between, and the values for, clinopyroxene megacryst  $^{87}\text{Sr}/^{86}\text{Sr}$  ratios for Group I and II kimberlites are similar to that found for groundmass perovskites in these kimberlite types (Woodhead et al., 2009).

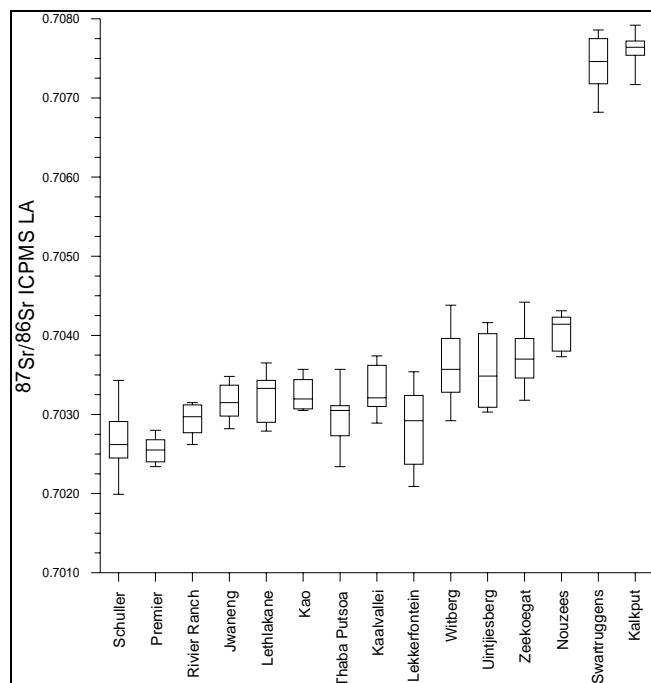


Fig. 2 A box-whisker plot of  $^{87}\text{Sr}/^{86}\text{Sr}$  values for clinopyroxene megacrysts from localities analysed in this study.

### References

- Woodhead, J, Hergt, J, Phillips, D and Paton, C (2009) African kimberlites revisited: In situ Sr-isotope analysis of groundmass perovskite. *Lithos* 112S, pp311-317.