## A ca. 2170-2166 Ma LIP on the Kaapvaal Craton, southern Africa: implications for chronostratigraphy and paleogeography

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The magmatic barcode technique has been successfully applied to derive the paleogeography of various cratons and their neighbours back into the Neoarachean based on a comparison of short-lived and extensive magmatic events, i.e., large igneous provinces (LIPs). In addition, LIPs on which these paleogeographic arrangements are based, have also been shown to be useful in chronostratigraphy and as drivers of environmental change. On the Kaapvaal Craton in southern Africa, such studies on LIPs have successfully been applied several times since the ability to routinely date baddeleyite. In this study, dykes in the same area and of the same trend as the ca. 2730 Ma ENE-trending Ulundi Dyke Swarm were studied, both in the White Mfolozi and the Buffalo River inliers of Archean basement of the south-easternmost Kaapvaal Craton. These dykes were altered at upper greenschist facies by the nearby Meso- to Neoproterozoic Namaqua-Natal Mobile Belt. Indeed, baddelevite extracted from these dykes is variably rimmed by zircon overgrowths. Despite discordance in the U-Pb system from these dykes, free regressions indicate a new magmatic event, with U-Pb crystallisation ages of ca. 2166-2172 Ma. Furthermore, the composition of these dykes is basaltic, with compositions suggesting either crustal contamination or a subduction-like signature. The crystallization ages presented in this study on dykes from the ENE-trending Dyke Swarm establish, for the first time, a ca. 2166-2170 Ma LIP on the Kaapvaal Craton. The similarity in age between this event and lavas in the upper Transvaal Supergroup within the Transvaal sub-basin invites comparison with both the < ca. 2248 Ma Hekpoort lavas and Machadodorp lavas preserved within the Pretoria Group of the upper Transvaal Supergroup stratigraphy. However, geochemical comparisons argue against a similarity, and a positive correlation cannot be made at this stage. However, further afield, a match between this new LIP and coeval events in Superior, Wyoming and Dharwar at ca. 2180-2150 Ma suggests the formation of a larger supercraton in the Paleoproterozoic and its subsequent breakup. A refined paleogeographic model can thus be proposed.

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