



## **The Paleoproterozoic Marathon Large Igneous Province: new evidence for a 2.1 Ga long-lived mantle plume event along the southern margin of the North American Superior craton**

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Three Paleoproterozoic dyke swarms, the Marathon, Kapuskasing and Fort Frances, that outcrop around the northern margin of Lake Superior, radiate from a focal region south of the lake. U-Pb dating shows that the Marathon swarm ranges in age between 2101 and 2126 Ma, and the Fort Frances between 2076 and 2067 Ma. The Kapuskasing swarm remains undated, but geochemical and paleomagnetic similarities with Marathon dykes suggest that its age is also close to 2100 Ma. The convergence of dyke swarm trends to a common focal area, together with the lack of apparent polar wander during the time interval of 2125 to 2067 Ma, suggests that a single, periodically active, plume was responsible for all three swarms. Only a single magnetic field reversal has been recognized throughout the 60 m.y. of plume activity. This observation, together with U-Pb geochronology, has helped to place dykes within each swarm into older and younger sub-populations based on magnetic polarity. For the dyke population as a whole, older dykes tend to show more enriched and more fractionated incompatible trace element patterns compared to younger ones, a result that may indicate a secular reduction in the degree of crustal contamination over the course of plume activity.