

PLUME-GENERATED MAGMATISM IN THE SUPERIOR PROVINCE.

¹SPROULE, R. A., ^{1,2}TOMLINSON, K. Y., ¹LESHER, C. M., ³THURSTON, P. C., and ³AYER, J. A. ¹Mineral Exploration Research Centre, Department of Earth Sciences, Laurentian University, Sudbury, Ontario, P3E 2C6. ²Continental Geoscience Division, Geological Survey of Canada, Ottawa, Ontario, K1S 0E8. ³Precambrian Geoscience Section, Ontario Geological Survey, Sudbury, Ontario, P3E 6B5.

The influence of mantle plumes on tectonics is hotly debated with implications for styles of volcanism, heat flow, and cratonization processes in the Archean. Mafic-ultramafic rocks in the Wabigoon subprovince (WS), the North Caribou terrane (NCT), and the Abitibi Greenstone Belt (AGB) in the Superior Province exhibit variations in geochemistry that aid in the elucidation of models for Archean tectonics. The NCT and WS contain sedimentary-komatiite-tholeiite sequences overlying basement in greenstone belts that have been dated at 2.96-2.90 Ga (WS) and 2.93 Ga (NCT). The komatiite sequences in the AGB formed within the narrow interval 2.720-2.701 Ga. Variations in komatiite geochemistry in the WS and NCT may be explained by geochemical variations across a plume head, including material from the plume axis (ADK), middle plume head (AUK), and outermost plume head (basalts). Variations in komatiite geochemistry in the AGB may be also be explained by variations across a plume, including the plume axis (ADK, Ti-depleted komatiites, and Al-enriched komatiites) and middle plume head (AUK and Ti-enriched komatiites). However, wide geochemical variations occur within individual temporally distinct assemblages, within individual flow sequences, and rarely, within individual intercalated flows, which are difficult to reconcile with a simple plume model. This may imply subtle variations in the composition of the source region or the influence of subsequent petrogenetic processes (degree of partial melting, AFC, mixing, and metamorphism/alteration).