EARLY MESOPROTEROZOIC (1.5-1.3 GA) MAGMATIC AND TECTONIC EVOLUTION OF THE SE LAURENTIAN CRATONIC MARGIN:IMPLICATIONS OF U-PB, SM-ND, AND LU-HF DATA

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1.3-1.5 Ga A-type plutons preserve information about their crustal lithospheric source regions and hence can serve as probes of subsurface lithospheric architecture. New and compiled U-Pb, Sm-Nd, and Lu-Hf data for rocks of the Eastern Granite-Rhyolite Province (EGRP) and the Southern Granite-Rhyolite Province (SGRP) reinforce earlier interpretations that there is a well-defined SE limit to Paleoproterozoic (> 1.6 Ga) lithosphere of the Laurentian craton, such that southern and eastern portions of the provinces were built on juvenile (ca. 1.4 to 1.5 Ga) lithosphere, whereas western and northern portions were built on, or derived from, 1.63 to 1.96 Ga lithosphere. Lu-Hf data for zircons from cratonic portions give model ages of 1.76 to 1.96 Ga and confirm dominantly Paleoproterozoic ages for lower crustal source regions. SHRIMP and LA-ICPMS ages for zircon grains confirm previous TIMS ages and reveal that zircons from most plutons do not have older inherited cores, implying that magma temperatures and magma compositions were not conducive to preservation of xenocrystic zircon. These data also suggest heterogeneity in lower-crustal source regions due to interaction of juvenile magma with lower crustal materials of various ages. Granites from juvenile parts of the EGRP and SGRP yield Lu-Hf model ages of 1.44 to 1.60 Ga, from which we infer extensive 1.5 to 1.3 Ga mafic to intermediate juvenile rocks in deeper parts of these provinces, consistent with accretion of arcs ca. 1.44 to 1.49 Ga and 1.35 to1.37 Ga. Constraints on viable models for 1.5-1.3 Ga Laurentia tectonism include: 1) Craton-hosted 1.5 to 1.3 Ga plutons extend throughout Paleoproterozoic basement of the central and western US, implying continental-scale lower crustal melting; 2) Back-arc models require a broad, shallow-dipping subducting plate that detached and rolled back over ca. 50 Ma following each accretion event; 3) Spreads of ages in single locations (e.g. Wet Mountains) suggest long-lived thermal sources and may support delamination or superplume models; 4) Younging of A-type plutons westward, especially for 1.5 to 1.4 Ga plutons, suggests westerly migration of heat sources.