Accretion of North America: from Earth's Oldest Intact Rocks to Paleoproterozoic Break-Up

BLEEKER, W. AND PERCIVAL, J., Geological Survey of Canada, Ottawa, Canada K1A 0E8, wbleeker@gsc.nrcan.gc.ca

The North American craton, Laurentia, is cored by a collage of at least six Archean cratons welded together by ca. 1.8 Ga Paleoproterozoic orogenic belts. Reworked margins of Archean cratons typically are lower plates beneath Proterozoic collisional belts, further emphasizing the overall proportion and importance of Archean crust in Laurentia.

Earth's oldest intact rocks, the ca. 4.05 Ga Acasta gneisses, occur in the Slave craton, which preserves a history of rapid, episodic events throughout the Archean terminating in a period of transient stability and deposition of a thin but widespread cover sequence at ca. 2.86-2.80 Ga. Similar Meso- to Paleoarchean cratonic nuclei, with similar cover sequences, are known from many other Archean cratons (e.g., Superior, Wyoming, Nain, Zimbabwe, Yilgarn) and indeed may represent the scattered remains of a ca. 3.0-2.9 Ga supercontinent.

Break-up of this early supercontinent was associated with abundant plume events and may have been diachronous over as much as 200 my, initiating the ca. 2.7 Ga global orogenic cycle (the onset of modern plate tectonics?). Dispersed continental fragments and intervening juveniles arc sequences were swept together during a ca. 100 my interval straddling 2.7 Ga, resulting in at least two larger supercontinents. The collisional and final thermal maturation history of cratons such as the Slave and the Superior are sufficiently distinct to preclude that they were incorporated into the same supercontinent. Following a more prolonged period of stability, ca. 2.47-2.0 Ga mafic dyke swarms heralded the onset of Paleoproterozoic break-up.