


Thin Crust


 < 35 km


*Normal Thickness
Continental Crust*

 35 - 40 km

 40 - 45 km

Thick Crust

 45 - 50 km

 > 50 km

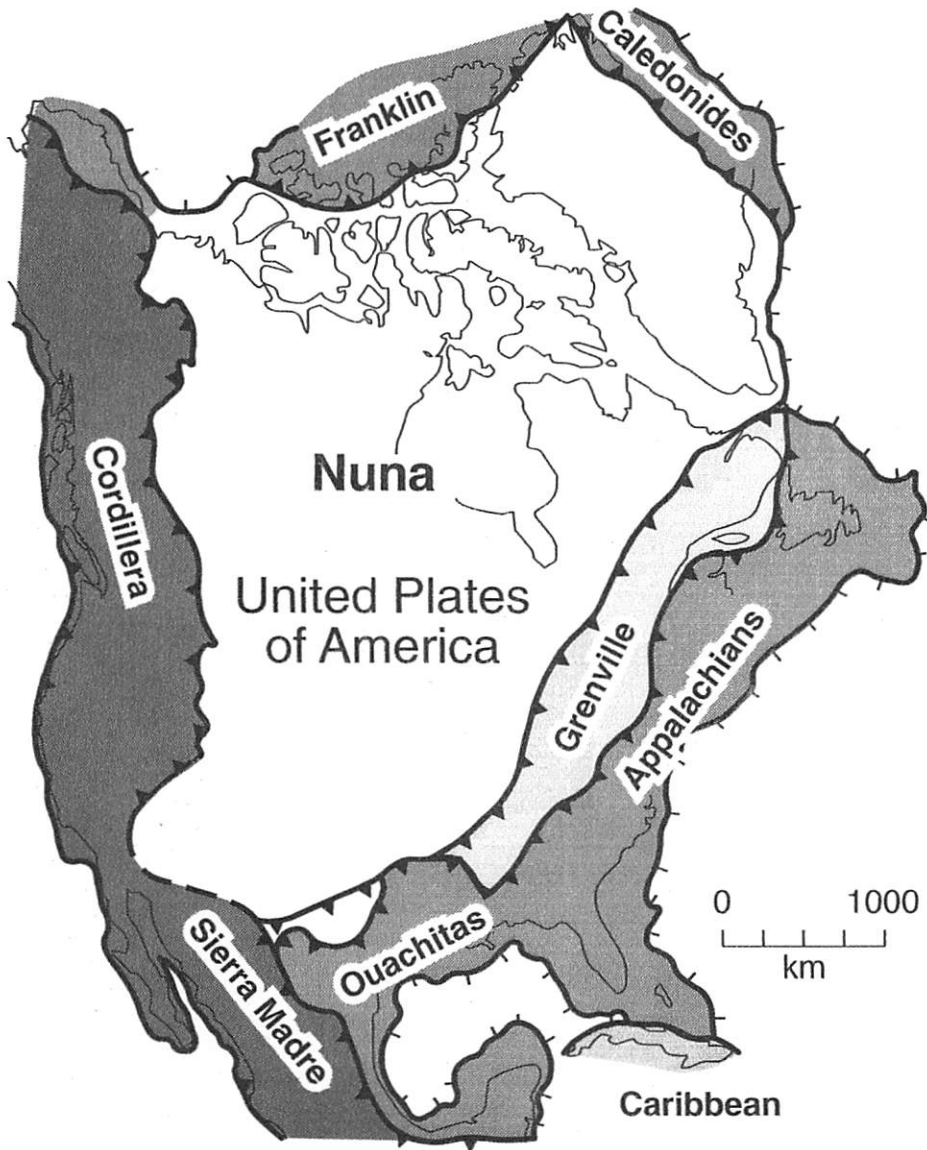


FIGURE 22.6.1 Simplified orogenic structure of North America: a Paleoproterozoic nucleus, Nuna, is discontinuously bordered by the Mesoproterozoic Grenville and Racklan (far northwest) Orogens; the Paleozoic Ouachita, Appalachian, Caledonide, and Franklin Orogens, and the Mesozoic-Cenozoic Cordilleran and Caribbean Orogens. Greenland is restored to pre-rift (>90 Ma) position.

22.6.2 Phanerozoic (545–0 Ma) Orogens and Pangea

The stable interior of North America is framed by two great Phanerozoic orogenic systems. The Cordilleran

will eventually collide with the Pacific Ocean. Then it will have incorporated the Pacific Ocean basin.

The other Phanerozoic orogenic system is the Appalachian Orogen. During the Paleozoic, the Appalachian Orogen includes the Appalachian and Franklin orogens. The Appalachian Orogen evolved from a collisional margin that collided with Baltica in geotectonic zone 4. The northern Appalachian Orogen collided with Baltica and Ouachita sectors of Gondwanaland. The Appalachian Orogen was dismembered and opened.

22.6.3 Neoproterozoic Orogens

Gondwanaland (Africa, South America, southern Eurasia, and Australia) was welded together by collisional orogens during the Paleozoic accretionary period. North America had displaced continental margins that were incorporated into the Appalachian Orogen during the Paleozoic time. A tectonic event occurred in the Paleozoic

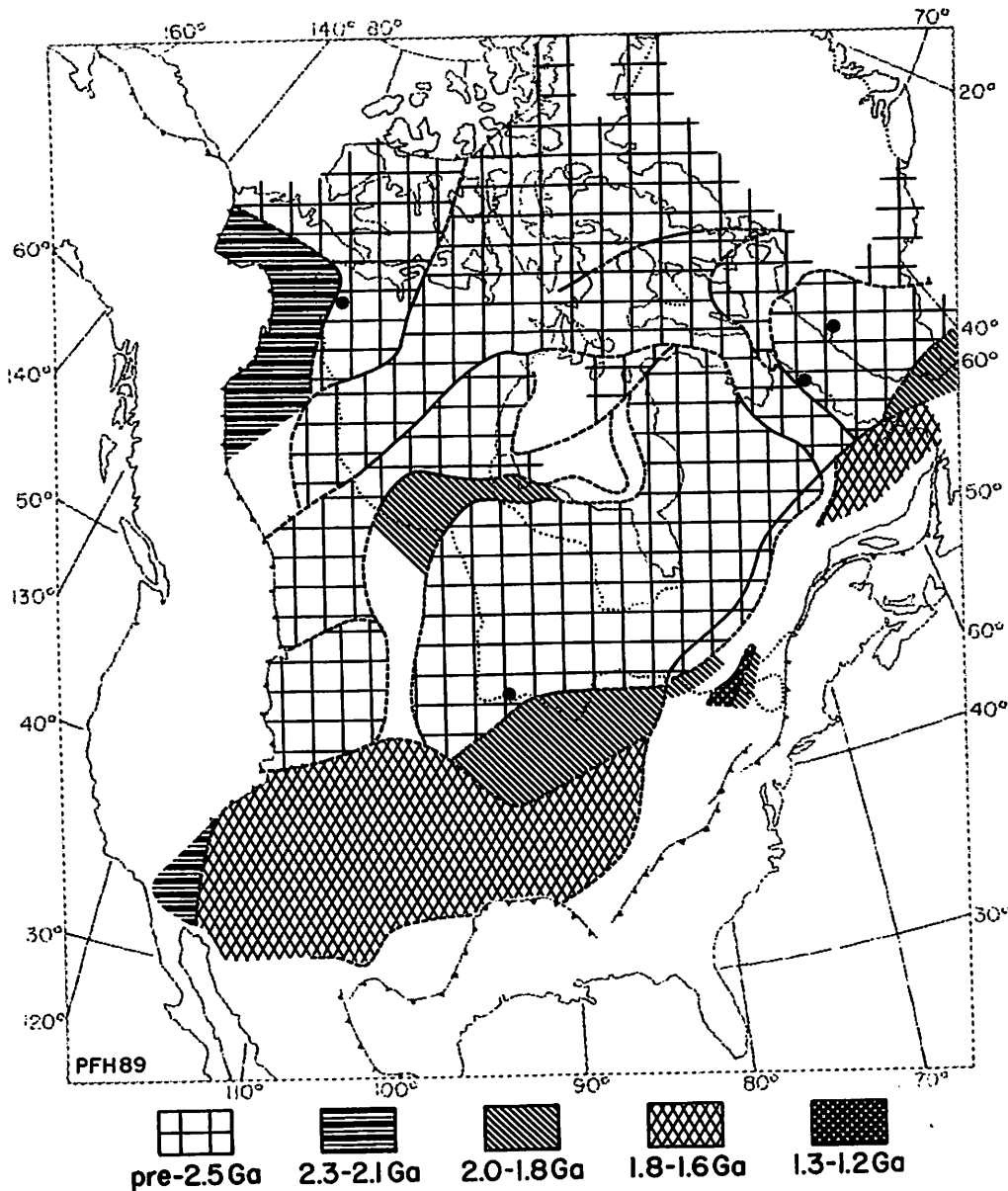


Figure 1. Distribution of crust by age of formation for the North American shield and platforms. Pre-drift restoration of Greenland after Rowley and Lottes (1988). Dotted lines indicate edge of shield. Areas of uncertain crust-formation age are unpatterned. Heavy dots locate crust over 3.5 Ga. Inferred Proterozoic sutures between areas of Archean (pre-2.5 Ga) crust are indicated by pattern offsets.

(Central Plains and Yavapai-Mazatzal orogens respectively). Extensions of the same age occur in the Great Lakes area (Killarney belt) and southern Labrador (Labrador orogen), where they were reworked by the 1.2- to 1.0-Ga Grenvillian orogeny. Except for the more internal zones of the Grenville orogen, the Laurentian

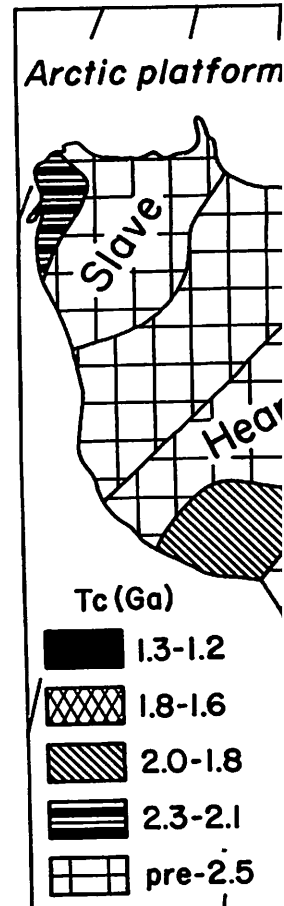


Figure 2. Distribution of crust in the Arctic platform and Greenland indicated as in Figure 1. Heavy dots locate crust over 3.5 Ga. Uplift of the mantle upwelling

The Grenvillian orogeny in southern Mexico involved thrusting between terranes accreted to the western part of the continent. Proterozoic and Paleozoic continent rift (formed continental fragments). Meanwhile, the 1.27 Ga in the

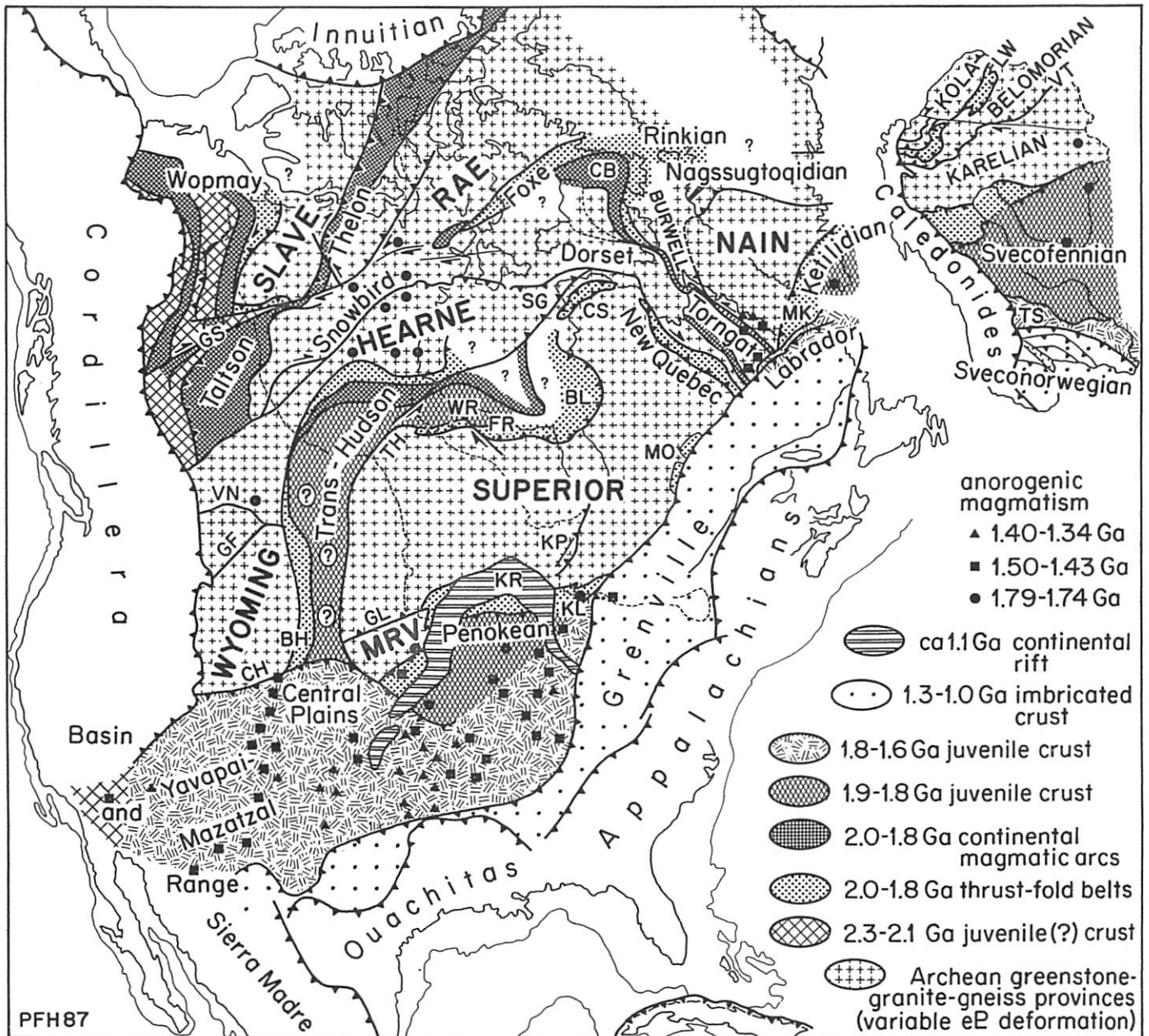


Figure 13. Precambrian tectonic elements of the North American craton (platform cover removed) and Baltic shield. Upper case names are Archean provinces; lower case names are Proterozoic and Phanerozoic orogens. BH, Black Hills inlier; BL, Belcher fold belt; CB, Cumberland batholith; CH, Cheyenne belt; CS, Cape Smith belt; FR, Fox River belt; GF, Great Falls tectonic zone; GL, Great Lakes tectonic zone; GS, Great Slave Lake shear zone; KL, Killarney magmatic zone; KP, Kapuskasing uplift; KR, Keweenaw rift; LW, Lapland-White Sea tectonic zone; MK, Makkovik orogen; MO, Mistassini and Otish basins; MRV, Minnesota foreland; SG, Sugluk terrane; TH, Thompson belt; TS, Trans-Scandinavian magmatic zone; VN, Vulcan tectonic zone; VT, Vetreney tectonic zone; WR, Winisk River fault.

events, the Archean basement was tectonically thickened and folded, along with its Early Proterozoic cover (Thomas and Gibb, 1985; Patterson, 1986). Transcurrent shear zones developed to accommodate postcollisional indentation by the Slave and north-eastern Superior provinces (Fig. 14; Thomas and Gibb, 1983).

Burwell province

Toward the northern tip of Labrador, the Early Proterozoic Torngat orogen (Fig. 3) bifurcates into a pair of major shear zones, between which lies the Burwell province, composed

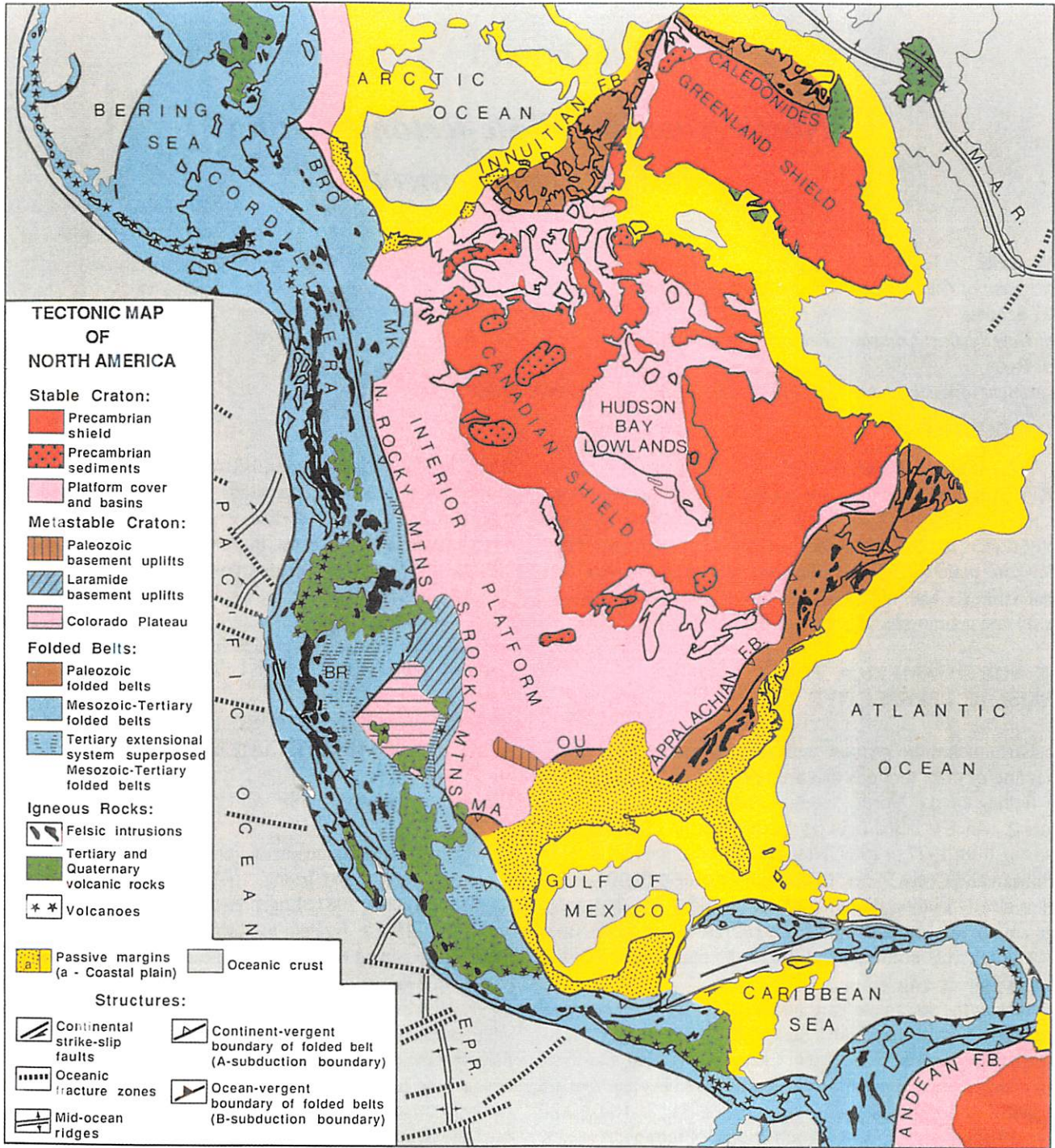


Figure 1. Simplified tectonic map of North America. BR - Basin and Range; BRO - Brooks Range; MK - Mackenzie Mountains; MA - Marathon uplift; OU - Ouachita Mountains; M.A.R. - Mid-Atlantic Ridge; E.P.R. - East Pacific Rise.

