

Merguerian, Charles, 1986a, Tunnel vision - A deep view of the bedrock geology of New York City (NYC).

The middle Proterozoic basement (Fordham Gneiss) and overlying lower Paleozoic metamorphic tectonites of NYC have been imbricated by regionally important ductile faults. Related to the development of intrafolial F_2 folds of an early S_1 foliation, the ductile faults are exposed in a 300m-wide zone found beneath the East River channel along a $N60^\circ W$ -trending, 8 m-wide water tunnel newly excavated 240 m beneath Manhattan and western Queens. Here, lower Paleozoic rocks of the Inwood Marble, Manhattan Schist, and Hartland Formations occur in subvertical NE-trending imbricate slices deformed by isoclinal to tight F_3 folds. Cameron's Line, the ductile contact between Cambro-Ordovician eugeoclinal rocks of the Hartland Formation and coeval allochthonous transitional rocks of parts of the Manhattan Formation, is marked by a 3 m sliver of sheared diopsidic marble and by intense F_2 intrafolial folds, 1 cm- to 4 cm-scale mylonitic layering, and protomylonitic syntectonic pegmatite in the wallrocks. Locally, highly laminated Hartland rocks are in mylonitic contact with units of the Fordham Gneiss suggesting that in NYC, Cameron's Line cuts across the basal Paleozoic unconformity into Proterozoic basement. An unnamed ductile fault to the west of Cameron's Line places the Hartland and parts of the Manhattan Formations structurally above units of the miogeoclinal Inwood Marble. Invariably, the steep NE-trending ductile faults found both separating and within the slices have been reactivated by brittle faults marked by fresh clay-rich gouge up to 5 cm thick. In addition, NW-trending, steep NE-dipping faults and joints are lined with calcite, pyrite, and zeolite minerals. These left-lateral faults, bearing sub-horizontal slickensides, show overprint by N- to NE-plunging slickensides which mark a change from strike-slip to oblique-normal slip movement. These data corroborate geologic relationships established by surface mapping in NYC.

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