

Dismembered Ophiolite in NYC

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Serpentinities found in the NYC area are dismembered “alpine-type” ophiolitic scraps. Including the famous Staten Island NY and Hoboken NJ serpentinites, nearly a dozen masses have been reported in NYC and vicinity. In NYC, they are in ductile fault contact with the surrounding Hartland or at the Manhattan-Hartland contact. They are identical in mineralogy and structural setting to small, zoned, highly sheared isolated pods found along strike in the New England Appalachians where they are invariably found within sheared eugeosynclinal rocks of the Hartland formation and correlatives. However, New England serpentinites are found associated with aluminous schist and amphibolite and locally with stratabound metalliferous oxide and sulfide deposits and/or garnetiferous quartzite. An example would be the Forge Hill locality in western MA.

The recent (late 2004-early 2005) excavation of a deep construction site between 42nd and 43rd Streets west of Sixth Avenue in midtown Manhattan has exposed a steeply inclined 10 m by 5 m ellipsoidal serpentinite body wrapped by a thin concentrically zoned shear envelope. The 0.5 m envelope grades outward from massive serpentinite to talc-chlorite schist to chlorite schist to biotite schist and is followed by a 3 m layer of massive amphibolite and then by garnetiferous mica schist and garnet-mica granofels of the surrounding Hartland formation. The base of the serpentinite mass is not exposed so the down-plunge extent of the mass is unknown. In NYC and vicinity, the association of serpentinite and the aluminous Hartland formation allows the interpretation that the serpentinites are slivers of dismembered ophiolite preserved in a sheared eugeosynclinal matrix. In deeply eroded terrains, such as the New England Appalachians, where significant deep-seated shearing, metamorphism, and imbrication of rock units have taken place, complete three-layer ophiolite sequences are seldom found presumably the result of significant internal shearing in a former convergent margin setting.

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