

STRUCTURAL GEOLOGY AND METAMORPHISM OF THE INWOOD MARBLE, NYC, NY

MERGUERIAN, Charles; and MERGUERIAN, J. Mickey, Geology Department, Hofstra University, 141 Gittleson Hall, Hempstead, NY 11549, geocmm@hofstra.edu.

Within and around the type locality in NYC, the Inwood Marble is a tan to gray weathering dolomite- and calcite metacarbonate rock with four major lithotypes – (1) massive white, coarse-textured calcite marble, (2) thick-layered white to gray predominately dolomitic marble with calc-silicate interlayers, (3) thin-layered gray to tan marble with tan to brown schist and calc-silicate rock (4) thick-layered white to gray marble with interlayered gray quartzite and calc-silicate layers and lenses. Fresh samples from shafts and tunnels show mineral-controlled color variation of whitish (sericite \pm tremolite), gray to dark gray to bluish (graphite \pm pyrite), tan to dark brown to peach (phlogopite \pm dravite), and green (chlorite \pm diopside). The microscope shows the presence of previously unreported sphene, apatite, clinozoizite, and fluorescent tremolite. The regional foliation in the Inwood ($S_1 \times S_2$) is developed parallel to compositional layering. At Isham Park the $S_1 \times S_2$ foliation trends $\sim N55^\circ E$, 73° SE and forms the eastern limb of an overturned F_3 antiform flanked westward by synforms cored by resistant Manhattan and underlying Walloomsac schists in Inwood Hill Park. Locally, the marble, schist, and calc-silicate unit is internally deformed by F_2 tight- to intrafolial isoclinal folds with associated boudinage and shearing of gray quartzite, calc-silicate rock, and schistose marble blocks over a meter in dimension. Late porphyroblasts of calcite, diopside, tremolite, and plagioclase overgrow the $S_1 \times S_2$ foliation and are typically a few cms in size but tremolite crystals can range up to 12 cm in length. Outcrop-scale folding and warping of the $S_1 \times S_2$ fabric is controlled by SW-plunging F_3 folds and by later open 2m-wavelength SE-plunging F_4 folds ($\sim 50^\circ$ plunge) with axial planar slip cleavage (S_4) solution cleavage and joints trending $\sim N-S$ with moderate to steep eastward dips. Consistent with amphibolite facies metamorphism of the adjacent pelitic rocks the Inwood metacarbonates contain tremolite + diopside but no fosterite. The alignment parallel to F_3 hingelines of late tremolite porphyroblasts (commonly pseudomorphic *after* diopside) indicates that the rock mass was retrograded during the D_3 late Taconian (?) event.

To Cite This Abstract: Merguerian, Charles; and Merguerian, J. Mickey, 2012, Structural geology and metamorphism of the Inwood marble, NYC, NY: Geological Society of America Abstracts with Programs, v. 44, no. 2, p. 73.