

Northeastern Section - 47th Annual Meeting (18–20 March 2012)

**Paper No. 40-6**

**Presentation Time:** 1:30 PM-5:30 PM

**ANALYSIS OF FOLD INTERFERENCE PATTERNS AND FABRIC ELEMENTS IN THE NOXON ROAD OUTCROP, DUTCHESS COUNTY, NEW YORK, AND THEIR SIGNIFICANCE FOR THE DEFORMATION HISTORY OF THE GIDDINGS BROOK SLICE OF THE TACONIC ALLOCHTHON**

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Understanding the deformation history of the Giddings Brook Slice is critical for interpreting the mechanics of emplacement of the Taconic Allochthon. A historic debate has been the relative roles of compressional and gravity tectonics. Early models (e.g., Zen 1967) were based on a gravity sliding mechanism. Later studies (e.g., Rowley and Kidd, 1981; Stanley and Ratcliffe, 1985), and mechanical arguments (e.g., Davis et al., 1983), largely replaced this with a thrust-tectonics model, however questions remain about the emplacement history. An outcrop of highly crenulated phyllite on Noxon Road has been featured in numerous field guides (e.g., Bence and McLelland, 1976; Fisher and Warthin, 1976; Whitney and Peck 2004; Vollmer and Walker, 2009), but has not undergone detailed structural analysis. The lithologies present are Austin Glen (AG) greywacke, green and red slates of the Mount Merino and Indian River (MM), and a thinly layered micrite. AG is in fault contact with MM. One question addressed is whether all units enjoyed a common deformation history. Fold interference patterns and multiple foliations occur within all units indicating a complex deformation history. The primary layering ( $S_0$ ) is typically tightly to isoclinally folded ( $F_1$ ), then refolded ( $F_2$ ) about mainly upright chevron-style folds.  $S_0$  was transposed and highly disrupted during  $F_1$ , which may have occurred prior to complete lithification. Apparent sedimentary breccias and complex contact relationships, suggest the possibility of gravity-induced deformation. However, a  $S_1$  cleavage, which is crenulated about a  $S_2$  cleavage, appears to be axial planar to  $F_1$ , suggesting post-lithification deformation. Structures within all units have similar orientations, suggesting a common deformation history. Analysis of fold interference patterns and orientations of  $F_1$ ,  $F_{20}$ , and  $F_{21}$  suggest refolding of tight  $F_1$  folds. A girdle pattern of  $F_{20}$  hinges rules out co-axial refolding ( $\gamma = 90^\circ$  of Thiessen and Means, 1980).

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[General Information for this Meeting](#)

Session No. 40--Booth# 23

[Structural Geology \(Posters\)](#)

Hartford Marriott Downtown: Ballrooms A & C and Ballroom Pre-function Area  
1:30 PM-5:30 PM, Monday, 19 March 2012

Geological Society of America *Abstracts with Programs*, Vol. 44, No. 2, p. 96

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