

2013 GSA Annual Meeting in Denver: 125th Anniversary of GSA (27-30 October 2013)

Paper No. 247-53

Presentation Time: 9:00 AM-6:30 PM

**TECTONIC SIGNIFICANCE AND AGE RELATIONSHIPS OF JOINT SETS
IN THE EASTERN CATSKILL MOUNTAINS, NORTH-SOUTH LAKE
AREA, NEW YORK**

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The orientations of regional joint sets in the Allegheny Plateau of south-central New York have been used to delineate paleostress trajectories associated with the Appalachian Orogen (e.g., Engelder and Geiser, 1980), however, with the exception of Isachsen, et al. 1977, little work has been done in the Catskill Mountains of New York. An ongoing study in this region is being conducted at SUNY New Paltz. These studies are motivated in part by the lack of age constraints on the Hudson Valley fold thrust belt (HVFTB), which has been variously interpreted as Acadian or Alleghanian, and how it transitions into the Catskill Mountains. In general, two dominant joint sets occur, similar to the Allegheny Plateau, however proximity to, and parallelism with, structures of the HVFTB suggest a cogenetic relationship. The Catskill escarpment, which defines the eastern edge of the Catskill Mountains, as well as many other topographic features, are controlled by a NNE striking joint set, paralleling HVFTB. We report here the results of a detailed study conducted along the escarpment, near North-South Lake. Joint orientations were measured on meter plus scale joints from planar sets. Surface features such as plume and hackle structures were noted. Features denoting age relationships, including truncations and joint curvature indicating propagation towards preexisting fractures, were recorded. Analysis of 418 joint measurements give two clearly defined maxima (strike - dip) at $099^{\circ} - 67^{\circ}$ (J1) and $017^{\circ} - 88^{\circ}$ (J2). Surface features, and the absence of slickensides, indicate the joints are extensional, presumably tensile, fractures. Age relationships consistently show J1 older than J2, however reactivation of older joints near the escarpment can locally give conflicting results and mutually crosscutting relationships. One hypothesis is that J1 are cross-strike joints related to HVFTB compression, and J2 are strike-parallel joints related to bending stresses. This is consistent with the orientation of HVFTB, but difficult to reconcile with models for the Allegheny Plateau. Alternatively, J2 may Alleghanian, and J1 Acadian or Alleghanian. An Alleghanian age is consistent with models for the Alleghanian Plateau, but requires the decoupling of stresses between the Catskill Mountains and the HVFTB, presumably along a decollement.

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[General Information for this Meeting](#)

Session No. 247--Booth# 281

[Sigma Gamma Epsilon Undergraduate Research \(Posters\)](#)

Colorado Convention Center: Hall D

9:00 AM-6:30 PM, Tuesday, 29 October 2013

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