Northeastern Section - 48th Annual Meeting (18–20 March 2013)

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JOINT AND BEDROCK CONTROL OF TOPOGRAPHY, DRAINAGE PATTERNS AND SURFACE HYDROLOGY, WARNER CREEK AND STONY CLOVE DRAINAGE BASINS, CATSKILL MOUNTAINS, EASTERN NEW YORK

Paper No. 65-9
Presentation Time: 1:30 PM-5:00 PM

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A three year NSF sponsored REU program hosted at SUNY New Paltz was conducted to characterize the Esopus Creek watershed of the New York City water supply in the Catskill Mountains, New York. A wide range of hydrological, geological, biological, and chemical studies were conducted, including extensive surficial geologic mapping. We present the results of the only study designed to characterize the effect of bedrock geology on hydrology, specifically looking at joint orientations to show the significance of bedrock structures in watershed hydrologic processes. Goals were to determine joint control on stream orientations, to compare joint orientation data with previous studies, and to investigate the tectonic significance of jointing. Bedrock exposures along roads, streams, and trails were utilized, with additional exposures identified from GIS data and aerial photographs. Positions were determined using topographic maps and a handheld GPS unit. Joint orientations were measured using a standard pocket transit. Accurate bedding measurements are difficult due to extensive cross-stratification, however bedding is near-horizontal. The data was analyzed using Orient (Vollmer, 2010), an orientation analysis program, to plot joint and stream orientations on rose diagrams. ArcGIS was used to produce topographic, hill-shade, and stream drainage maps. Over 500 joint orientations at over 100 stations were collected. Two major joint sets were found, with mean strikes of 021° and 096°. Stream orientations were plotted on a rose diagram, and have an axial mean of 022°, suggesting that the 021° joint set is a significant control on stream orientations. The hill-shade maps also demonstrate the strong control of joints on the topography. This data expands on studies of Engelder and Geiser (1980) in the central and western Catskills, and is similar to data of Isachsen et al. (1977) in a study of the hypothesized Panther Mountain impact structure. The jointing is thought to be related to Alleghanian and possibly Acadian orogenic events.

Session No. 65--Booth# 53
T33. Watershed Management: BIO-GEO-CHEMICAL Perspectives (Posters)
Tuesday, 19 March 2013: 1:30 PM-5:00 PM

Omni Mount Washington Resort Grand Ballroom South

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