2015 GSA Annual Meeting in Baltimore, Maryland, USA (1-4 November 2015)

Paper No. 214-2
Presentation Time: 9:00 AM-6:30 PM

INVESTIGATION OF A RELICT PERIGLACIAL FEATURE: HICKORY RUN BOULDER FIELD, HICKORY RUN STATE PARK, PENNSYLVANIA

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The centerpiece of Hickory Run State Park is a prominent, 1 km-long expanse of boulders located just south of the Last Glacial Maximum boundary in the Appalachian Plateau province, northern Carbon County, Pennsylvania. Designated as a National Natural Landmark, this gently sloping (<1°) deposit of angular to sub-rounded sandstone and conglomerate clasts, many of which are up to several meters long, is revered for its enigmatic beauty. Although periglacial processes have been invoked to explain the formation and transport of the boulders, it has yet to be shown whether the field developed solely during the LGM, or whether it originated considerably earlier and has evolved over multiple glacial/interglacial cycles. Here we report on the remote sensing techniques we used to develop a sampling strategy for cosmogenic nuclide analysis with the goal of understanding the age and history of the boulder field.

Using eCognition, an automated classification program, along with aerial imagery taken by a UAV, we analyzed trends in size, roundness, and orientation of boulders. Results show a decrease in size and an increase in boulder alignment and roundness down the primary axis of the field. While collecting samples, we observed large blocks on top of small, polished cobbles, and groundwater flowing beneath much of the field and adjacent wooded areas. We hypothesize that block roundness is an indicator of increased age, and that boulder alignment is indicative of downslope transport, perhaps facilitated by subsurface water. The nearby forest is encroaching on the boulder field, with duff forming soils between blocks; we hypothesize that these forest blocks may have been the first to cease movement, and blocks in the main body of the field may have different, perhaps shorter, and likely more dynamic exposure histories.

To test these hypotheses, we sampled boulders (n=53) in transects across the boulder field, in the surrounding forest, and on nearby tors (which some believe are the source of the field) for cosmogenic 10-Be and 26-Al analysis; extractions are in progress. Results will be used to test for patterns of boulder age downslope, differences in age between the forest and field, complex burial history (i.e. shielding by ice, toppling of blocks), and will also suggest whether blocks originated on nearby hillslopes or formed in-situ.

Session No. 214--Booth# 216

T57. Soil to Sediment and Channels—From Geologic to Modern Time Scales: A Session to Honor the Work of Milan Pavich (Posters)
Tuesday, 3 November 2015: 9:00 AM-6:30 PM

Exhibit Hall (Baltimore Convention Center)

Geological Society of America *Abstracts with Programs.* Vol. 47, No. 7, p.550

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