# Oral (Saturday, April 27, 2019)

Ryan Clark (Iowa Geological Survey), Ray Anderson (Iowa Geological Survey - retired), David Peate (University of Iowa Dept of Earth and Env. Sciences), Allison Kusick (University of Iowa Dept of Earth and Env. Science), Kenny Horkley (University of Iowa), Anonymous

An Update on the Northeast Iowa Intrusive Complex (NEIIC)

Copper-nickel sulfide and platinum group element deposits have been identified along the north shore of Lake Superior in Ontario (Coldwell Complex) and the western shore in Minnesota (Duluth Complex). These magmatic deposits are related to the Midcontinent Rift System and are geophysically distinct, with high amplitude magnetic anomalies and associated gravity highs. The NEIIC has an aerial extent of over 6,000 mi2 consisting of several large ring/horseshoe shaped geophysical anomalies and associated linear features. Characterizing these features using geophysics has been done, yet with a limited number of boreholes that reach the NEIIC, accurate lithologic and geochronologic data has remained elusive. An exploration core drilled in 1963 intersected a dike thought to be related to the NEIIC and encountered 722 feet of ultramafic rocks. The Iowa Geological Survey and the University of Iowa are using pXRF and micro probe analyses to isolate datable minerals. Preliminary results show there are distinct zones within the core that have elevated uranium and zirconium, typically in the form of baddeleyite or zirconolite. Obtaining a reliable age date from this core could provide the answer to whether the NEIIC is in fact related to other economic mineral deposits in the Lake Superior region.

# Oral (Saturday, April 27, 2019)

Chad Heinzel (UNI), Danika Patten (Land and Water Stewards AmeriCorps), Logan Letellier (Green Iowa Americorps)

Characterization of Dry Run Creek Sediments

The University of Northern Iowa resides within the Dry Run Creek (DRC), 15,177 acre, watershed. This creek is scientifically and socially fascinating because it lies with a dynamic rural to urban landscape. Many students and faculty have investigated the creek’s environmental parameters; this study presents new geochemical and geophysical data from the creek’s bank sediments. These data compliment on-going inquiries of water quality, sediment provenance, bank stabilization, habitat and efforts to mitigate stream urbanization. Quantitative analyses are being conducted using a PanAlytical X-ray Fluorescence (XRF) machine and by sieving Dry Run Creek sediment samples. Geochemically we are recording both concentrations (ppm) and relative percentages of ten oxide compounds (e.g. SiO2, Al2O3, P2O5) and twenty elements (As, Ba, Cr, Pb, Sr, Zr). The chosen compounds and elements should aid in characterization of the sediments origin, weathering profiles and contamination. Sieving and some pipetting is beginning to characterize Dry Run Creek bank sediment size from 32mm to 4.0 µm. The collected geophysical data will aid in the interpretations of stream discharge, potential erosion/sediment yields and geologic history.

# Oral (Saturday, April 27, 2019)

Lee Potter (University of Northern Iowa)

The production of alkalic magmas in Northeast New Mexico: a call to old, failed rifting

Alkalic melts were emplaced in Northeastern New Mexico starting at 37 Ma. They fall on an alignment, the Jemez Lineament, which stretches NE-SW through the region and offsets at the Jemez Mountains and Rio Grande Rift (RGR). Compositions range from older intrusive trachyte-trachyandesite and lamprophyre, to phonolite-carbonatite that ended about 20 Ma. At ~8 Ma, activity resumed as basalt-rhyodacite volcanism. The existential question: why are these magmas here? Workers have viewed the Jemez Lineament as “a leaky transform” on the flank of the RGR. Others suggest weakness along an ancient basement suture, and even stresses in the higher crust. Some call upon the Eastern Rocky Mountains Alkalic Belt; a result of subduction to the West. This author goes on record that another option should be considered: reactivation of an older, failed, extension event: the Southern Oklahoma Aulacogen. With a WNW-ESE orientation, a distal fragment of the SOA sits under NE New Mexico. The grain of lamprophyre dikes, phonolite intrusions, and some volcanic centers follows the orientation of the SOA. A reactivation of the failed extension by stress reorientation is reasonable. Magmas that were not produced originally, may have formed lateras they do in modern rifting analogs.

# Poster (Friday, April 26, 2019)

Zachary Dingbaum (Upper Iowa University)

Weathering of Giant Erratic Boulders on the Iowan Erosion Surface

A megaflood origin has recently been proposed to explain the geomorphic features of the Iowan Erosion Surface, including distribution and thickness of loess, orientation and composition of streamlined paha hills, extensive boulder trains, tracts of giant ripples, deeply incised bedrock gorges, and amphitheater-headed canyons. These features resemble those found in the Channeled Scablands of western Washington and other recently recognized megaflood landscapes. A boulder train of giant erratic boulders of granitic composition on the Iowan Erosion Surface may be related to outburst flood(s). Study of weathering features of the giant erratic boulders offers new evidence for the timing of their exposure, transport and deposition. Preliminary results of a study of relief of orthoclase feldspar phenocrysts will be presented.

# Poster (Friday, April 26, 2019)

Katherine McCarville (Upper Iowa University)

Standing on the Shoulders of Giants: Integrating Observations, Descriptions, and Interpretations of Early Workers with a New Interpretation for Formation of the Iowan Erosion Surface Landform Region

Geologists and geomorphologists working in Iowa have long remarked on the enigmatic characteristics of the Iowan Erosion surface of northeast Iowa. Early workers invoked glacial processes, periglacial processes, and most recently, pedogenic processes to explain the genesis of this region, and all of these are without doubt involved to some degree in shaping the landscape, yet none alone has provided a satisfactory explanation. However, the geomorphic features of the Iowan Erosion Surface, including loess distribution and thickness, streamlined paha hills, extensive boulder trains, deeply incised bedrock gorges, and amphitheater-headed canyons suggest formation by a megaflood. This review of previous work on the geology, geomorphology, and soil development of the Iowan Erosion surface integrates several instances of observations, descriptions and interpretations that can be aligned with and may support this new interpretation.

# Poster (Friday, April 26, 2019)

Alexa Sedlacek (University of Northern Iowa), Ryan Clark (Iowa Geological Survey), Riley McMorran (University of Northern Iowa), Joshua Sebree (University of Northern Iowa), Brian Witzke (University of Iowa),

Application of Carbon Isotope Stratigraphy of the Middle to Upper Devonian (Givetian-Frasnian) Cedar Valley Group in the Iowa Basin: Preliminary Results from the BETA Project

The Middle Devonian age Cedar Valley Group was deposited on the marine epeiric carbonate platform of the Iowa Basin and records several transgressive-regressive cycles throughout the Givetian (upper Middle Devonian). Four major T-R cycles within the Cedar Valley Group are well-documented. In this study, undergraduate students from the Biogeochemical Evolution of The Atmosphere (BETA) Project at the University of Northern Iowa sampled successions of the Cedar Valley Group, including the Peterson Core (W-11749) for d13Ccarb. The Peterson Core was drilled in 1960 into a known dome structure located in northeastern Webster County, Iowa to investigate its potential for natural gas storage. The 2,185 feet deep core contains approximately 580 feet of Devonian strata, has been lithostratigraphically described and biostratigraphically constrained in previous studies, and is housed at the Iowa Geological Survey’s Core Facility. Samples from the Gizzard Creek and Iowa City members of the Coralville Formation and the Osage Springs and Idlewild members of the Lithograph City Formation were drilled and analyzed for δ13Ccarb. Our preliminary results indicate that the δ13Ccarb document a general decrease from -2.7‰ to -4.7‰ within the Coralville Formation and an increase from -2.7‰ to -0.6‰ in the Lithograph City Formation. The approximately 2 ‰ increase between the formations is consistent with the unconformable contact at the sequence boundary. Future work will correlate δ13Ccarb trends in core and quarry sections from the Cedar Valley Group across north-central and northeastern Iowa, with a focus on the presence of minor unconformities occurring within single T-R cycles and provide additional characterization of sea level change within the Devonian Iowa Basin.