42nd Annual

GEOSCIENCE DAY

April 29, 2016
134 Weyandt Hall

Indiana University of Pennsylvania
Geoscience Department

Forty-Second Annual

GEOSCIENCE DAY

PROGRAMS AND ABSTRACTS

INDIANA UNIVERSITY OF PENNSYLVANIA
GEOSCIENCE DEPARTMENT

April 29, 2016
Room 134 Weyandt Hall

Program Schedule

Session 1: Energy and the Environment

8:00 Kyle Eldridge
Environmental Site Assessment of the Robinsteen Collar and Leather Co. Property Indiana, PA

8:15 Dom Affinito
Possible Shallow Subsurface Detection of a Contaminant Plume with the Use of Ground Penetrating Radar

8:30 Ray Ward
Locating Abandoned Wells Using GIS and Geophysical Techniques in Western Pennsylvania

8:45 Aaron Rotto
Digital Image Analysis With Potential for Ground Truthing

9:00 Chad Miedel
Significant Chemical and Mineralogical Signatures in Soils Surrounding a Potentially Leaking Natural Gas Well Brine Tank

- Coffee Break and Poster Session -

Session 2: Astronomy, Archeology, Structural Geology and Volcanology

9:45 Samantha Cooper
Mapping Mars River Systems: Paleoclimate Implications

10:00 Jonathan King
Site Formation Processes at Lawrenz Gun Club: A Micromorphologic Analysis of a Mississippian Structure

10:15 Shane Simcoviak
Influence on Volume Loss and Volume Gain within the Bellefonte Formation

10:30 Charles Cavallotti
Analysis of Focal Mechanism Solutions to Investigate an Apparent Aseismic Zone Beneath the Central Range, Taiwan

Notes:

Acknowledgements

Andrea Kiehl, Department Secretary
Brooke Saxinger, Office Assistant

The *Tangshanaspis-Apoplanias* Transition: Whittling Down a Gap in the Late Cambrian Time Scale

Dr. John F. Taylor

Roughly every five to six million years during the Cambrian, faunas on the Laurentian paleocontinent suffered a mass extinction that virtually depopulated the shallow marine shelf. In the wake of each extinction, the shelf was reoccupied by a homogenized replacement fauna of exceedingly low diversity, consisting entirely of one olenid or olenid-like trilobite genus that migrated inward from deep, off-shelf environments. In the last of these Cambrian events, that olenid genus was *Apoplanias*, which occurs in great abundance at the base of the aptly named *Apoplanias* Zone near the base of the Skullrockian Stage. This thin interval of maximum abundance, the *Apoplanias* Epibole, marks the point of minimum diversity that was attained following extirpation of the more diverse fauna of the underlying *Tangshanaspis* Zone and prior to faunal recovery recorded by the appearance of other genera such as *Parakoldinioidia* higher in the *Apoplanias* Zone. Detailed reconstruction of the pattern of faunal turnover and environmental conditions that prevailed during this latest Cambrian extinction has been hampered by a stratigraphic gap created in most places by a third-order drawdown of sea level that peaked during deposition of the *Apoplanias* Zone. High-resolution (sub-meter-scale) sampling of basal Skullrockian successions in many areas of Laurentian North America has established the presence of an unconformity at this level by confirming the absence of one or more of these thin intervals (*Apoplanias* Epibole, *Tangshanaspis* Zone, and underlying *Eurekia apopsis* Zone). However, recovery of all these faunas in some areas (e.g., the southern Oklahoma Aulacogen and northern Rocky Mountains in Wyoming/Montana) indicates more continuous deposition and a fairly intact record. Nonetheless, recent sampling of an upper slope succession in easternmost Alaska yielded a new fauna and prominent negative Carbon isotopic excursion that suggest that several meters of strata at that locality represent an uppermost segment of the *Tangshanaspis* Zone that has never been documented elsewhere. An isotopic excursion so closely associated with the extinction horizon raises interesting questions regarding the potential cause(s) of the faunal turnover, and might assist prove useful for identification of age-equivalent strata/events on other paleocontinents.

10:45 Aaron Voegtle
Flow Composition using Structure from Motion, Average Block Size, and MATLAB

11:00 Drew Yetter
LIDAR Studies of Lava Flows

11:15 Mike Barber
Mapping Mokst Butte Lava Flow in Central Oregon Using lidar Reflection Intensity Data and Field Observations

- Lunch Break -

Session 3: Hydrology, Oceanography and Paleontology

1:00 Dylan Gruse
Characterization of High Elevation Bogs in the Allegheny Front of the Appalachian Mountains

1:15 Jacob Brown
Seasonal Effect on Stream Water Temperature

1:30 Josh Master
Measuring the Impact of Atmosphere Pressure Variations on Stream Data Loggers in Indiana, Pennsylvania

1:45 Adam Caliguiri
Interpreting Dust Grain Size from the Central-Atlantic Ocean to Analyze Tropical Trade Wind Intensity Changes from the Pliocene to Pleistocene

2:00 Savannah Irwin
Ibexian Faunas of the Jones Ridge Formation, Ogilvie Mountains, East-central Alaska

2:15 Wesley Kamerer
Refined Age-dating and Correlations of Cambrian-Ordovician Limestone Deposits in Alaska and the Yukon Based Upon Agnostoid Arthropods

Session 4: Featured Alumni Presentation

2:30 Dr. John F. Taylor '75
The *Tangshanaspis-Apoplanias* Transition: Whittling Down a Gap in the Late Cambrian Time Scale

Environmental Site Assessment of the Robinsteen Collar and Leather Co. Property Indiana, PA

Kyle Eldridge

During the early 1900's a tanning factory, known as Robinsteen Collar and Leather Company, was operational in Indiana, Pennsylvania. A lack of environmental regulation in the United States at this time raises questions about this property's environmental condition. In order to assess the risk of contamination a Phase I Environmental Site Assessment was performed for the property to determine if Recognized Environmental Conditions (RECs) may exist. The methodology used to perform this ESA followed American Society for Testing and Materials (ASTM) guidelines and included a site reconnaissance, a site history review, and a review of available and applicable state and local government records. Research revealed that other commercial companies that operated on the Robinsteen Property in later years may have caused more potential RECs than those of the tanning company.

Refined Age-dating and Correlations of Cambrian-Ordovician Limestone Deposits in Alaska and the Yukon Based Upon Agnostoid Arthropods

Wesley Kamerer

The Dempster Volcanics in the Yukon Territory of northwestern Canada are a thick stack of igneous rocks that formed by extrusion of lavas into the deep marine waters of the Selwyn Basin on the passive margin of Laurentian paleocontinent in the Cambrian and/or Ordovician Periods. The stack also includes interstratified limestone deposits that are interpreted as olistostromes consisting of carbonate sand and gravel from shallower waters that was transported downslope and deposited on the submarine lava flows. The limestone deposits recently yielded agnostoid arthropods that provide the first unequivocal age for the volcanism. The agnostoid species *Kormagnostus seclusus* Walcott, which is restricted to the middle Cambrian Marjuman Stage, occurs in two of four faunal collections made from the Dempster Volcanics in summer 2015. The Neruokpuk Formation in northeastern Alaska contains a similar stack of igneous rocks and interstratified carbonate olistostromes known as The Whale Mountain Volcanics. The paleogeographic origin of the Whale Mountain volcanics is controversial. Possible origins include separation from the relatively nearby Dempster Volcanics and displacement to their present location along the Tintina Fault. Alternatively, they might have experienced significantly longer transport from the northern Appalachians via a massive transform fault during the opening of the Arctic Ocean. Agnostoids recovered from several localities in the Whale Mountain Volcanics are of late Cambrian age, hence younger than those in the Dempster olistostromes. This contrast in ages of the two volcanic successions weakens the interpretation of the Whale Mountain Volcanics as a detached portion of the Dempster Volcanics.

Ibexian Faunas of the Jones Ridge Formation, Ogilvie Mountains, East-central Alaska

Savannah Irwin

There have been very few biostratigraphic investigations of the Jones Ridge Formation since it was named in 1967 and all suffered from coarse resolution of the faunal collections recovered from the unit. During the 2011, 2012, and 2014 field seasons, additional sampling of the Jones Ridge Formation was conducted to increase the resolution of biostratigraphy for the section. Of particular interest was the location of the Cambrian-Ordovician boundary. Trilobite collections recovered from ten horizons within the uppermost 75m of the informal Hi-Yu member of the Jones Ridge Formation were assigned through associated conodonts to the basal Ordovician and uppermost Cambrian. One or more species of *Symphysurina* dominate(s) each of the seven Ordovician trilobite faunas, with four containing other trilobite genera and agnostoid arthropods as minor components. The three Cambrian collections contain species restricted to the *Tangshanaspis* Zone, although no species of *Tangshanaspis* itself are present. Brachiopods, both calcitic and phosphatic, are common in all collections. Although most or all of the *Symphysurina* species from the Jones Ridge are new, some strongly resemble established species in coeval faunas from Greenland. In contrast, none of the new Alaskan species compares closely with any of the numerous species of *Symphysurina* that occur in the same conodont zones in the Snowy Range Formation in Wyoming and Montana, or with any species reported so far from the rich silicified faunas in the Great Basin of the western USA. This apparent similarity of *Symphysurina* Zone taxa in faunas across northernmost North America, as opposed to those from the western part of the contiguous USA and southern Canada, suggests the existence of a distinct eastern Laurentian trilobite subprovince within the Laurentian faunal province during the earliest Ordovician.

Possible Shallow Subsurface Detection of a Contaminant Plume with the Use of Ground Penetrating Radar

Dom Affinito

Contaminant plumes can be mapped in the subsurface using geophysical techniques. One such technique, Ground Penetrating Radar, allows for the non-invasive investigation of the subsurface using variations in the travel time of electromagnetic waves as they propagate through materials and reflect energy back when materials with different physical properties are encountered. Natural gas wells and water treatment facilities produce a water high in salt and total dissolved solids known as brine. Due to brines high salinity it will appear more conductive when compared to regular ground water or surrounding soils and can be readily identified using certain geophysical investigative techniques. The movement of this conductive water can be tracked through the subsurface where it will move through areas of open voids or fractures. The formation of the brine over a certain area, if undisturbed, develops into a plume shape. Depending on subsurface conditions, this brine plume could be used to determine a likely area of where the contaminants came from. This study could be used to locate potential contaminant sources produced by brine water from natural gas wells or leaks due to a failure in waste storage.

Locating Abandoned Wells Using GIS and Geophysical Techniques in Western Pennsylvania

Ray Ward

Ever since the oil boom began with Colonel Drake in 1859, many oil and gas wells have been abandoned and left uncapped across Pennsylvania because of lack of drilling regulations. These uncapped wells can potentially cause harm to the environment, animals, and/or people who come across them. Wells can serve as pathways for oil and gas to migrate upwards and spill into aquifers or surficial waters. In order to test an already established method of locating abandoned wells in a new area, Laurel Ridge State Park in Southwest Cambria County will be the study area. The method that will be used is a combination of GIS, historic aerial imagery, and geophysics. This entails comparing historic images of the study area to a current PA Department of Environmental Protection (DEP) map of known wells using GIS. Once layered on top of one another, the images will be used to show changes over time to the area to look for any wells or roads that were used to get to a well. Once a specific area of interest has been located within the study area, a magnetometry survey will then be used to determine the presence of an abandoned well. This combination of methods will allow for more time and cost effective identification of potential well locations.

Interpreting Dust Grain Size from the Central-Atlantic Ocean to Analyze Tropical Trade Wind Intensity Changes from the Pliocene to Pleistocene

Adam Caliguiri

This study examines tropical trade wind intensity changes near the central Atlantic Ocean as the Earth transitioned from relatively warm climates during the Pliocene (5.3 to 2.6 Ma) into the Quaternary (2.6 to present) which is marked by periods of ice growth/decay in the northern hemisphere. During the warmer early Pliocene (2°-3°C warmer than current average global temperatures) weaker pole-to-equator thermal gradients in the northern hemisphere should have resulted in weaker northern hemispheric atmospheric circulation. The cooler Quaternary would be marked by alternating periods of stronger/weaker winds as the climate transitioned between interglacial and glacial periods. We have analyzed detailed particle size distribution data to infer Pliocene to Quaternary wind intensity from dust extracted from deep-sea sediment samples collected from a core taken downwind from the Sahara desert in the central-Atlantic Ocean (KN223-10LC2, 14°N, 50°W, water depth 4453m). Preliminary data show decreasing size of average dust grains in the early Pliocene with a minimum in average size just prior to the onset of Northern Hemispheric glacial cycles. Additional analyses of samples will provide a way to examine the record of trade wind intensity during the ancient ice ages.

Measuring the Impact of Atmosphere Pressure Variations on Stream Data Loggers in Indiana, Pennsylvania

Josh Master

Stream data loggers were placed in 31 streams around Indiana County by the Evergreen Conservancy to monitor the water quality of local waterways. They recorded stream temperature, the amount of total dissolved solids, and the water depth. The water depth measurement is given by a pressure sensor within the data logger. The pressure sensor is recording the actual water level and also atmospheric pressure for the water depth measurement. This creates a discrepancy of the data reading higher than the actual water depth that it is recording. This study addresses the magnitude of the high level measurements by means of data analysis from multiple controlled experiments conducted from May 2015 to March 2016. Two main experiments focused on understanding the relationship between atmospheric pressure and water level by controlled experimental processes from a data logger and an additional barometric logger. Results show no correlation between these two variables when the data was corrected for the discrepancy. Discoveries from this study will allow for the extraction of the water level values from the data and to more accurately account for water flux in local streams.

Digital Image Analysis With Potential for Ground Truthing

Aaron Rotto

Western Pennsylvania is believed to have had over 325,000 oil and gas wells drilled since 1859. During this time, some of the drilling locations or the status of those wells has been lost. These orphan or abandoned wells have potential to be leaking methane and produced water into the surrounding environment, which could contaminate ground water sources or contribute methane to the atmosphere. My research begins with a digital image analysis of aerial photographs taken between the 1940s and 2000's and attempts to identify areas where oil wells have been drilled or where the landscape has been modified to support the natural gas industry (i.e. roads, paths and tree clearing). The reason that I am using aerial photos is that a large area can be covered at one time and access to these images are free. The images from the Penn pilot data base range from the 1937 to 1972 and cover a four square mile area per image. I compare these images to a geographical information system available from the Pennsylvania Department of Environmental Protection (PADEP) where known natural gas wells have been plotted according to permit surveys, to identify areas where orphan or abandoned gas wells may be present, but not known to exist by PADEP. If sufficient target sites are identified during my aerial image analysis, they will be ground truthed using geophysical methods to confirm the presence of magnetic anomalies resulting from well field infrastructure using a magnetometer or areas of high conductivity from leaking brine using a terrain conductivity instrument.

Significant Chemical and Mineralogical Signatures in Soils Surrounding a Potentially Leaking Natural Gas Well Brine Tank

Chad Miedel

Clay rich soil cores were collected around a probable leaking brine tank associated with a conventionally natural gas well drilled into upper Devonian age sandstones in Montgomery Township, Indiana County Pennsylvania. An upslope sample that served as a control was compared to a sample taken downslope of the brine tank which was believed to be contaminated, once in June 2015 and again in October 2015. Soil cores were sub-sampled at 2.5cm intervals, then were freeze dried to remove moisture, crushed to a uniform fine-grained powder, and pressed into discoidal pellets for X-Ray Fluorescence analysis. A suite of elements ranging from Mg to Pu, with the exception of noble gasses, was measured in each sample and compared to assess possible brine components. XRF analysis was compared to the results of a comparable well both with proximity and age to a study done by Dresel in 2010. Elevated potassium levels showed a regional soil composition, while elevated calcium levels in the control sample were presumed to be influenced by road salt. No significant indication was shown with this research with unknown lapse of time the tank has been leaking or if rain influenced leeching of elements. If certain brine components do remain in the soils for long periods of time, portable X-Ray Fluorescence analysis may serve as a tool to confirm the location of previous drilling activities and may assist in identification of old abandoned or orphaned wells.

Seasonal Effect on Stream Water Temperature

Jacob Brown

The temperature regimes of small streams are controlled by discharge from outside sources and direct radiation from the sun. Working with Evergreen Conservancy to monitor Indiana County streams, data loggers were used to measure water temperature and other parameters on an hourly basis. Analyzing the data allowed us to assess the main controls on each streams temperature regime. Observations were made of the environment of the riparian zone at the data logger locations and upstream to allow for clarification of the controls for each stream. Previous studies have shown that there are specific temperature thresholds of aquatic biology. For example, trout become stressed at 21˚C (70˚F) and should not be fished. At 25˚C (77˚F), the condition is deemed lethal (Shmukler). If we are able to understand the influences on stream temperatures then we could help limit dangerous living conditions for aquatic biology and keep a healthy environment.

Characterization of High Elevation Bogs in the Allegheny Front of the Appalachian Mountains

Dylan Gruse

The Pennsylvanian aged Allegheny Front sections of the Appalachian Mountains create wetland areas that are typically bound by confining sandstone layers. Human interaction as well as natural processes can cause the formation of perched water tables resulting in similar vegetation, soils, and hydrology in different environments. Two naturally occurring wetlands will be compared to one man-made wetland area in order to determine what characteristics can be used to determine the origin of unknown wetlands in the future. I will measure differences by measuring the pH of the water, soil depth, and water flow. By analyzing the local topography and geology, I will be able to conclude differences in water chemistry, soil depth, and distribution of vegetation, determining key differences in formation. This project will provide both qualitative and quantitative data emphasizing the diversity and importance of these isolated systems.

Mapping Mars River Systems: Paleoclimate Implications

Samantha Cooper

With the prospect of humans potentially living on Mars by 2024, it is becoming increasingly more important that we understand Mars and its hydraulic history. Using the current data and HiRISE (High Resolution Imaging Science Experiment) images it has been possible to determine maximum ancient water flow on Mars within some of the river channels. High RESOLUTION images of Mars provide clear images of ancient river channels. ArcGIS was used to view different river systems within the Gale Crater for their maturity and duration of flow, as well as display elevation data in order to create cross sections and river gradients. Corresponding with elevation data and surficial process indicators, water flow and discharge equations helped to create a depiction of Mars' hydraulic history. Comparisons between Mars and Earth show similar features and processes on each planet. The Gale Crater displays multiple rivers systems, a delta, and the Yellowknife Bay, which made it a prime target for mapping and hydraulic history analysis.

Site Formation Processes at Lawrenz Gun Club: A Micromorphologic Analysis of a Mississippian Structure

Jonathan King

The Lawrenz archeological site is a Mississippian (900-1600AD) mound complex in the west-central Illinois River Valley. Several archeological and geological studies have been conducted to better understand the function and evolution of the site. Initial geophysical investigations of the site revealed several mound complexes, house-like structures, and paleochannels of the nearby Sangamon River. During the summer of 2015, one of the house structures was excavated and in-situ soil samples were taken from the southern soil profile for micromorphologic studies. This form of analysis involves creating thin sections to observe microscopic aspects of soils and sediments such as grain size, orientation, organic distribution, and mineralogy. The primary function of micromorphology in this study is to understand the processes that occur during site formation (i.e. from habitation to abandonment to excavation). This study reveals that the house basin has undergone rapid anthropogenic infilling demonstrated by the poor sorting of grains and lack of any primary sedimentary structures that would indicate hydraulic reworking. Additionally, the living surface of the house and the overlying fill sediment display differences in organic distribution and mineralogy, thus indicating that any modern soil development post-dates infilling.

Mapping Mokst Butte Lava Flow in Central Oregon Using Lidar Reflection Intensity Data and Field Observations

Mike Barber

Lidar (light radar) has revolutionized the acquisition of high resolution topographic data, and allows quantification and interpretation of volcanic terrains in remote and inaccessible areas. For this project, lidar data, field work, and lava bulk compositions are being used to map the chronology and surface features of the Mokst Butte lava flows in central Oregon. Mokst Butte is a Holocene scoria cone on the northwest flank of Newberry volcano, east of the High Cascades, in central Oregon. As part of a series of eruptions along the Northwest Rift Zone ca.7000 years ago, the Mokst Butte eruptions produced a large scoria cone and lava flow field covering an area of 24 km^2. Importantly for this study, the Mokst Butte eruptions occurred after the Mt. Mazama explosion and ashfall, and are thus largely free of obscuring ash, soil, and vegetation.

Lidar reflection intensity data were used to remotely classify a wide variety of surface morphologies in ArcGIS (lava surface features, rafted cone material, tephra, and vegetation). Field observations and samples gathered during 2014 and 2015, and by prior workers, were then used to confirm the nature of these features.

Our results show that disturbed lava and undisturbed lava can be identified by their low and distinctive lidar reflection intensities, ranging from 21 to 43 and 44 to 87 units, respectively, on a linear scale of 0 (minimum) to 251 (maximum) arbitrary units. Rafted cone material and organic matter are similarly identifiable in the lidar data, based on their higher reflection intensities of 88 to 110 and 111 to 255, respectively. Due to the very high inherent reflectivity of vegetation in the near infrared wavelength at which the Mokst Butte lidar data were collected, it is sometimes difficult to distinguish surfaces of high reflectivity from surfaces that are heavily vegetated. Specifically, areas blanketed by tephra, which have been shown to have high reflectivity in lidar data, are also typically heavily vegetated, because the tephra provides a good soil base.

LIDAR Studies of Lava Flows

Drew Yetter

Recent advancements in Geographic Information Systems (GIS), has allowed for large remote sensing data sets, such as Light Detection and Ranging (LiDAR), to be studied in detail by generating high resolution Digital Elevation Models (DEMs.) and intensity response images. High resolution (~1m horizontal accuracy) LiDAR images can be used to quantify lava flows allowing for detailed analyses of surface features. Surface intensity images allow for the characterization and evaluation of surface morphologies by assessing the strength of return in LiDAR pulses. Intensity values of lava flows are a function a variety of parameters, including composition and surface roughness. To date, few investigations have used laser intensity to analyze lava flows. This research compares the Lidar intensity values from five lava flows of the North West Rift Zone (NWRZ) in central Oregon over a range of compositions (~52.6 – 73.0 wt% SiO2) and surface features in order to determine the relationship between LiDAR intensity and lava composition. North Sugarpine (52.6 wt% SiO2) has average intensity values (< 0.3%), while Big Obsidian Flow (73.0 wt% SiO2) has as average (> 0.5%). Preliminary results suggest lower SiO2 content produces lava with low intensity returns.

Influence on Volume Loss and Volume Gain within the Bellefonte Formation

Shane Simcoviak

The Ordovician age Bellefonte Formation, a dolomitic carbonate that occurs just outside of Hollidaysburg Pennsylvania, records both volume loss and volume gain through stylolitization and veining, respectively. Stylolites form by localized pressure solution along irregular planes of stress concentration between mineral grains or crystals in the host rock. The insoluble minerals within the volume of host rock and the experienced dissolution are left behind as a dark seam usually on the scale of 1 mm in thickness. Each seam therefore represents a record of volume loss. Veins record a gain in volume within the Bellefonte through the precipitation of new minerals. The objective of this project is to document the geometries and relative ages of volume loss (stylolites) and volume gain (veins) in the Bellefonte Formation. Examinations of cross cutting relations between the veins and the stylolites, as well as amplitudes of measured stylolites will help determine timing of events. I will also examine these features in the context of the local bedding orientation so that interpretations of timing relative to tilting can be made. These observations will be used to better understand whether these secondary features predate deformation or not. Measured line transects of the Bellefonte have been used to record frequencies of stylolites and veins. This may present the quantity, and size of the secondary features in a cluster that will ultimately lead me to more accurate approximation of the timing of events.

Analysis of Focal Mechanism Solutions to Investigate an Apparent Aseismic Zone Beneath the Central Range, Taiwan

Charles Cavallotti

Taiwan is a seismically active and important example of the mountain building process by way of the ongoing arc-continent collision between the Eurasian and Philippine Sea plates. We show an aseismic zone beneath the Southern Central Range of Taiwan, bounded on its western flank by an area accommodating anomalous extension in a region experiencing rapid uplift. This apparent gap in seismicity is elongate in nature, trending generally northeast-southwest along the topographic grain of Taiwan. Map views of the events show a region north of the Southern Cross Island Highway, almost completely devoid of events at depths of 0-40km. Focal mechanism solutions of the events bounding this area were used to produce overlapping strain inversions assuming a micropolar model for crustal deformation. The area experiencing extension could be accommodating the continued rapid uplift of the region and the absence of seismic events in the zone beneath the Central Range may indicate the aseismic zone is a) a rigid block with no internal deformation, or b) ductile material without the shear strength required to generate seismic events.

Flow Composition using Structure from Motion, Average Block Size, and MATLAB

Aaron Voegtle

Mapping and sampling of lava flows in inaccessible locations is often a difficult task due to the rough terrain, harsh conditions, and in some cases inaccessibility. By taking images of flows around Oregon that vary in composition there is a possibility to develop a remote method of analysis that would negate the some of these risks. The images can be used to get the average lava flow block size and then comparing that to the composition in an attempt to find a method to remotely estimate the composition. A point cloud is generated from images of the flow and then the cloud is trimmed, scaled, cleaned and run through a series of MATLAB scripts to generate the computational average block size with other statistical results available for analysis. The raw results do not show any correlation between average block size and % silica content of the flows. The cleaned results do not show any correlation between average block size and % silica content of the flows.