

# The Compass: Earth Science Journal of Sigma Gamma Epsilon

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Volume 87 | Issue 3

Article 1

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1-19-2016

## Sigma Gamma Epsilon Student Research Poster Session, Geological Society of America Meeting 2015, Baltimore, Maryland, USA

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### Recommended Citation

Even, Paula (2015) "Sigma Gamma Epsilon Student Research Poster Session, Geological Society of America Meeting 2015, Baltimore, Maryland, USA," *The Compass: Earth Science Journal of Sigma Gamma Epsilon*: Vol. 87: Iss. 3, Article 1.

Available at: <https://digitalcommons.csbsju.edu/compass/vol87/iss3/1>

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# SIGMA GAMMA EPSILON STUDENT RESEARCH POSTER SESSION, GEOLOGICAL SOCIETY OF AMERICA MEETING 2015, BALTIMORE, MARYLAND, USA

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## ABSTRACT

The 2015 Sigma Gamma Epsilon Undergraduate Research (Poster Session) took place during the 2015 Geological Society of America annual meeting in Baltimore, Maryland on Tuesday, 3 November 2015. One hundred-one (101) posters were presented at the SGE poster session. The National Council of Sigma Gamma Epsilon awarded the Austin A. Sartin Best Poster Award to Kayleigh M. Harvey and Carrie A. Menold, students at Albion College. Kate C. Grisi and Michael Cl Rygel, students at State University of New York, College at Potsdam, were awarded the National Council's Best Poster Award.

**KEY WORDS:** Austin A. Sartin award, Sigma Gamma Epsilon National Council's best poster award

## 2015 Austin A. Sartin Award



Recipient of the 2015 Austin A. Sartin Best Poster Award is Kayleigh M. Harvey and Carrie A. Menold from Albion College. The title of their poster: *Using Pseudosections to Help Constrain the Metamorphic Evolution of UHP Eclogite in the North Qaidam Metamorphic Belt, Western China*. Excepting the award from Dr. Aaron Johnson, National SGE President, is Kayleigh M. Harvey.

**Abstract:** In the Luliang Shan, ultrahigh-pressure (UHP) eclogite occur as boudins in felsic gneiss. Pseudosections for the host gneiss and thermobarometric calculations for the eclogite are in good agreement, and show that both units experienced similar conditions during peak and retrograde metamorphism. While the thermobarometry data allows for an accurate assessment of

the peak and mid-crustal stages, it lacks the ability to predict the composition of the eclogite at all stages of its metamorphic history. This study analyzed the accuracy and reliability of pseudosections for low variance mafic rocks. Comparing the pseudosections to petrologic analysis as well as to traditional thermobarometric calculations allows for greater certainty that the results are accurate. The Luliang Shan eclogite preserves four distinct petrologic stages along the peak to retrograde P-T path: a peak eclogite facies stage ( $25 \pm 2.5$  kbar and  $590 \pm 25^\circ\text{C}$ ), lower eclogite facies stage ( $16 \pm 2.5$  kbar at  $650 \pm 25^\circ\text{C}$ ), continued exhumation to upper amphibolite facies ( $605 \pm 25^\circ\text{C}$  and  $13 \pm 2.5$  kbar) and finally a lower amphibolite stage ( $510$ - $425^\circ\text{C}$  and  $5$ - $12$  kbar). The petrology and mineral chemistry of each stage can be compared to the pseudosection predictions for the same rocks. These stages fall within large phase fields in the pseudosection, which is problematic for determining an exact P-T path with only the pseudosection. Thus, additional modeling of garnet composition and metasomatic reactions aid in constraining a P-T path with pseudosections. With careful selection of parameters, pseudosections can aid in recreating the metamorphic history of mafic rocks.

### 2015 National Council's Best Poster Award



Recipient of the 2015 National Council's Best Poster Award is Kate C. Grisi and Michael C. Rygel from the State University of New York, College at Potsdam. The title of their poster: *Carbon and Sulfur Geochemistry of Possible Marine Zones within the Pennsylvanian Joggins Formation, Nova Scotia, Canada*. Excepting the award from Dr. Aaron Johnson, National SGE President, is Kate C. Grisi.

**Abstract:** The Pennsylvanian Joggins Formation is a 932.4 m thick unit that contains 15 cyclothems, each of which records an initial flooding event followed by progradation of terrestrial facies. Although long considered to be nonmarine, recent paleontological discoveries suggest that flooding zones at the base of the formation record marine conditions. We assess the paleohydrology of cycle-bounding shales and limestones by examining their sulfur isotope geochemistry and ratio of organic carbon to pyrite sulfur. Sulfur isotope values of pyrite can be used to assess circulation patterns because bacterial sulfate reducers are free to process largely light sulfur in open circulation conditions, but forced to use increasing amounts of heavy sulfur in restricted conditions.  $\delta^{34}\text{S}$  values of pyrite ranged from  $-8.76\text{‰}$  to  $+23.00\text{‰}$ , indicating that the basin was relatively restricted and did not regularly and freely exchange water with the open ocean. The ratio of organic carbon to pyrite sulfur can be used as a measure of “marineness” because pyrite formation is limited by the availability of sulfate in freshwater environments and

organic matter in marine environments. Organic carbon to pyrite sulfur values increased from 0.71 near the base of the formation to 3.50 at the top of the formation, suggesting a waning marine influence. This work supports recent paleontological studies that proposed decreasing marine influence through time, provides some of the first geochemical evidence of restricted marine conditions, and highlights geochemical analyses that may be used to supplement the sparse paleontological record of marine conditions.

### **Posters Presented at the 2015 Sigma Gamma Epsilon Poster Session**

THE VIEW FROM 2015: SIGMA GAMMA EPSILON CELEBRATES ITS CENTENNIAL (1915-2015)

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TRACE ELEMENT GEOCHEMISTRY OF THE UTICA-POINT PLEASANT FORMATIONS

**EDGIN, Matthew G.**<sup>1</sup>, **COLE, David R.**<sup>2</sup>, **SHEETS, Julia M.**<sup>2</sup>, **WELCH, Susan A.**<sup>2</sup>, **OLESIK, John**<sup>3</sup> and **CHIPERA, Steve**<sup>4</sup>, (1)4320 woodhall rd, columbus, OH 43220, (2)SEMCAL, School of Earth Sciences, The Ohio State University, 275 Mendenhall, 125 South Oval Mall, Columbus, OH 43210, (3)School of Earth Sciences, The Ohio State University, 125 S. Oval Mall, Columbus, OH 43210, (4)Chesapeake Energy, Oklahoma City, OK 73154, edgin.4@buckeyemail.osu.edu

METAMORPHOSED AND MYLONITIC PSEUDOTACHYLYTES FROM THE HOMESTAKE AND SLIDE LAKE SHEAR ZONES, COLORADO, USA

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VARIANCE IN SOIL DEPTH AND ITS INFLUENCE ON SPECIES RICHNESS WITHIN AND AMONG CEDAR GLADES IN MIDDLE TENNESSEE

**GOSS, Brandi**<sup>1</sup>, **SHAW, Darrius**<sup>2</sup>, **GRESEHOVER, Sarie**<sup>3</sup>, **LEMAY, Joseph**<sup>3</sup>, **WALCK, Jeffrey**<sup>3</sup> and **HOWARD, R. Stephen**<sup>3</sup>, (1)Biology, Florida State University, 600 W College Ave, Tallahassee, FL 32306, (2)Biology, University of West Georgia, 1601 Maple St, Carrollton, GA 30118, (3)Biology, Middle Tennessee State University, 1301 East Main Street, Murfreesboro, TN 37132-0001, beg12b@my.fsu.edu

NEW U-PB AGES FROM PLUTONS IN THE SOUTHERN COAST MOUNTAINS BATHOLITH, BRITISH COLUMBIA

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CONTROLS ON STRAIN PARTITIONING IN THE WHITE HORSE CREEK MYLONITES,  
WEST COAST, NEW ZEALAND

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SILICATE MINERAL ALTERATION IN THE RHIZOSPHERE OF NORWAY SPRUCE IN  
THREE CATCHMENTS OF THE SLAVKOV FOREST, CZECH REPUBLIC

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GEOCHEMISTRY AND GEOTHERMOBAROMETRY OF PLAGIOCLASE AND  
AMPHIBOLE FROM THE HICKS BUTTE COMPLEX, CENTRAL CASCADES,  
WASHINGTON

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GEOCHEMISTRY OF THE HICKS BUTTE COMPLEX, CENTRAL CASCADES,  
WASHINGTON: REMNANTS OF A LATE JURASSIC VOLCANIC ISLAND ARC WITH  
INTRUDING EARLY CRETACEOUS ADAKITES

**STINGU, Shanna C.**<sup>1</sup>, MACDONALD Jr., James H.<sup>1</sup> and PECHA, Mark<sup>2</sup>, (1)Marine &  
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SKARN FLUID HISTORY RECORDED IN OH AND TRACE ELEMENT ZONING IN A  
RASPBERRY GARNET FROM SIERRA DE CRUCES, MEXICO

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DENDROARCHAEOLOGY IN THE NORTHWESTERN ADIRONDACKS: A BEGINNING  
TO REGIONAL PALAEOCLIMATE RECONSTRUCTIONS

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ERUPTIONS TRIGGERED BY MAGMA MIXING AT MOUNT JEFFERSON, CASCADE RANGE, OREGON

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STRATIGRAPHY, PROVENANCE, AND DEPOSITION OF THE UPPER MIOCENE BOLEO FORMATION, SANTA ROSALÍA BASIN, BAJA CALIFORNIA SUR, MEXICO

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AN ORGANIC PROVENANCE ANALYSIS OF LATE PENNSYLVANIAN BLACK SHALES FROM THE MIDLAND BASIN

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USING MAJOR AND TRACE ELEMENTS TO TRACK THE TRANSITION FROM SUBDUCTION TO RIFTING IN THE SANTA ROSALIA BASIN, GULF OF CALIFORNIA, BAJA CALIFORNIA SUR, MEXICO

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GEOCHEMICAL EVOLUTION OF ORE FLUIDS, BOLEO CU-MN-ZN-CO DISTRICT, BCS, MEXICO

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EVALUATING THE QUANTITY AND COMPOSITION OF SUSPENDED SEDIMENTS IN THE EPHEMERAL STREAMS OF TAYLOR VALLEY, ANTARCTICA

**HENDERSON, Kate M.**<sup>1</sup>, GOLDSMITH, Steven T.<sup>2</sup>, WELCH, Susan A.<sup>3</sup>, SHEETS, Julia M.<sup>4</sup>, DOWLING, Carolyn B.<sup>5</sup>, WELCH, Kathleen A.<sup>6</sup>, HALL, Cynthia<sup>7</sup> and LYONS, W. Berry<sup>3</sup>, (1)Department of Geography and the Environment, Villanova University, 800 Lancaster Avenue, Villanova, PA 19085, (2)Department of Geography and the Environment, Villanova University, G65C Mendel Science Center, 800 E Lancaster Avenue, Villanova, PA 19085, (3)School of Earth Sciences, The Ohio State University, 275 Mendenhall Laboratory, 125 South Oval Mall, Columbus, OH 43210-1398, (4)SEMCAL, School of Earth Sciences, The Ohio State University, 275 Mendenhall, 125 South Oval Mall, Columbus, OH 43210, (5)Department of Geological Sciences, Ball State University, Muncie, IN 47306, (6)Byrd Polar and Climate Research Center, The Ohio State University, 1090 Carmack Rd, 108 Scott Hall, Columbus, OH 43210-1002, (7)Department of Geology and Astronomy, West Chester University, 750 S. Church Street, West Chester, PA 19383, khender9@villanova.edu

CLIFF-EDGE HEMLOCKS (*TSUGA CANADENSIS*) IN THE NORTHWESTERN ADIRONDACKS: SENSITIVE INDICATORS FOR PALAEOCLIMATE RECONSTRUCTIONS?

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PHOSPHOROUS AND SEDIMENT FLUXES ANALYSIS IN AQUIA CREEK BASIN, VIRGINIA, USA

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THE TEMPORAL AND SPATIAL DISTRIBUTION OF TRACE METALS IN THE FLUVIAL AND LACUSTRINE SEDIMENTS OF THE SOUTHERN CHESAPEAKE BAY BASIN

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USING SHALLOW SEISMIC REFRACTION AND GROUND TEMPERATURES TO EXAMINE SUBSURFACE FLOWPATHS AT BURGDORF HOT SPRINGS, IDAHO

**NICKELSON, Shane**<sup>1</sup>, LINDSEY, Cary R.<sup>2</sup>, PRICE, Adam<sup>3</sup> and FAIRLEY, Jerry P.<sup>2</sup>, (1)Lewis and Clark State College, Lewiston, ID 83501, (2)Department of Geological Sciences, University of Idaho, Moscow, ID 83844-3022, (3)Department of Geological Sciences, University of Idaho, 875 Perimeter Drive, MS3022, Moscow, ID 83844-3022, shnickelson@lcmail.lcsc.edu

PETROFABRIC ANALYSIS OF SAMPLES FROM THE CYCLOTHEM SEQUENCES OF THE WESTERN IRISH NAMURIAN BASIN (WINB) DEFORMED WITHIN THE VARISCAN FORELAND FOLD THRUST BELT

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PETROGRAPHIC CHARACTERIZATION AND INTERPRETATION OF THE CINTA COLORADA MARKER BED, BOLEO DISTRICT, SANTA ROSALIA, BCS, MEXICO

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INVESTIGATING THE EXTENT OF THE EARLY MIOCENE COOK CANYON TUFF, A MAJOR PRE-PEACH SPRING TUFF IGNIMBRITE, SW USA, USING GEOCHEMISTRY AND PETROGRAPHY

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THE EFFECTS OF THE HEMLOCK WOOLLY ADELGID ON SOIL WATER CHEMISTRY

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SOIL ORGANIC CARBON AND NITRATE PROFILES ASSOCIATED WITH LAND MANAGEMENT HISTORY: THE ANTIOCH FARM, YELLOW SPRINGS, OHIO

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UNDERSTANDING THE ERUPTION HISTORY OF SP CRATER, NORTHERN ARIZONA, THROUGH TEPHRA MAPPING

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MINERALOGICAL AND GEOCHEMICAL CHARACTERIZATION OF COOK CANYON TUFF NEAR KINGMAN, AZ WITH IMPLICATIONS FOR MAGMATIC PROCESSES

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LATERAL FLORAL VARIABILITY IN THE EARLY PALEOCENE NACIMIENTO FORMATION, SAN JUAN BASIN, NM

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TUFF OF BONELLI HOUSE, PART 1: PETROLOGIC CHARACTERIZATION IN TYPE AREA AT KINGMAN, REGIONAL CORRELATION AND CONSTRAINTS ON EXTENT

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A PALEOELEVATION HISTORY OF THE PATAGONIAN ANDES FROM HYDRATED VOLCANIC GLASS

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SODIUM AND CHLORIDE CONCENTRATIONS AND SEASONAL BEHAVIOR IN THE OHIO RIVER AND ITS SUBWATERSHED, THE GREAT MIAMI RIVER

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PORTABLE X-RAY FLUORESCENCE (PXRF) AS A FIELD TOOL FOR HIGH-RESOLUTION GLOBAL BIOGEOCHEMICAL STUDIES

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UNDERSTANDING THE AMOUNT OF NITRATE IN RELATION TO PERCENT OF ORGANIC MATTER IN RIPARIAN BUFFER ZONE SOILS AT STREAM T3 IN HUDSON, ILLINOIS

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SUBAQUEOUS TUFFS IN THE EARLY MIOCENE VOLCANIC SEQUENCE, BLACK MOUNTAINS, AZ, AND SACRAMENTO MOUNTAINS, CA

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ATOMIC FORCE MICROSCOPY INVESTIGATION OF HETEROGENEITY IN SMECTITE SWELLING

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SOIL CREEP RATES UNDER PORTIONS OF THE HARTWICK COLLEGE CAMPUS: ONEONTA, NEW YORK

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DISTRIBUTION OF SULFIDE MINERALS IN METASEDIMENTARY DEPOSITS OF THE APPLE CREEK FORMATION, SALMON RIVER MOUNTAINS, IDAHO

**MURPHY, C. Claire**, **GRONDIN, Francis D.**, **VINCENT, Houston A.**, **CLARK, Stacey C.**, **WOLAK, Jeannette M.** and **HARRISON, Michael**, Department of Earth Sciences, Tennessee Tech University, Box 5062, Cookeville, TN 38505, ccmurphy42@students.tntech.edu

SEASONAL VARIATIONS OF STABLE ISOTOPE RATIOS OF PRECIPITATION IN DAYTON AREA AND SUSTAINABLE WATER RESOURCES

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PETROLOGY, BULK COMPOSITION, AND PROVENANCE OF METEORITE NWA5000

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THE RESPONSE OF AGGLUTINATED BENTHIC FORAMINIFERA TO DISSOLUTION EVENTS IN THE LATEST PALEOCENE

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DIGITIZING A PALEONTOLOGICAL COLLECTION: LEARNING AND LABOR

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SULFATE CONCENTRATIONS AND DYNAMICS IN THE MAUMEE AND GREAT MIAMI RIVER

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MAPPING THE EXTENT OF THE COOK CANYON TUFF IN THE SOUTHERN BLACK MOUNTAINS AND CERBAT MOUNTAINS OF ARIZONA VIA ADVANCED SPACEBORNE THERMAL EMISSION AND REFLECTION RADIOMETER (ASTER) IMAGERY

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CHARACTERIZATION AND QUANTIFICATION OF THE INTERACTION BETWEEN HEAVY METALS AND MICRO-BEADS IN PERSONAL CARE PRODUCTS: POTENTIAL IMPACTS OF PLASTIC PRODUCTS AT THE BALTIMORE HARBOR, MD

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INTEGRATING TECTONIC PROCESSES WITH STRUCTURAL GEOLOGY, SEDIMENTOLOGY, AND ENVIRONMENTAL GEOLOGY USING A DEFORMATION SANDBOX MODEL

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MIOCENE TUFF OF BONELLI HOUSE, NW ARIZONA: PETROCHEMICAL CONSTRAINTS ON MAGMATIC PROCESSES AND COMPARISON TO UNDERLYING PEACH SPRING TUFF

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ASSESSING HOW ROCK TYPE AND RELATIVE EROSION RATE CONTROL THE CONCENTRATION OF BEDROCK-INCISING GULLIES; GABILAN MESA, CENTRAL COAST RANGES, CALIFORNIA

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STRAIN ANALYSIS ACROSS THE MARGINS OF THE ELKAHATCHEE AND COLEY CREEK PLUTONS, ALABAMA EASTERN BLUE RIDGE: IMPLICATIONS FOR THE ALEXANDER CITY FAULT

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CARBON AND SULFUR GEOCHEMISTRY OF POSSIBLE MARINE ZONES WITHIN THE PENNSYLVANIAN JOGGINS FORMATION, NOVA SCOTIA, CANADA

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STRIKING GRAPHITE BEARING CLASTS FOUND IN TWO ORDINARY CHONDRITE SAMPLES; NWA6169 AND NWA8330

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#### BIOMASS DETERMINATION OF FOREST ECOSYSTEMS

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#### USING PSEUDOSECTIONS TO HELP CONSTRAIN THE METAMORPHIC EVOLUTION OF UHP ECLOGITE IN THE NORTH QUIDAM METAMORPHIC BELT, WESTERN CHINA

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#### HOW DOES A FOREST ECOSYSTEM SOIL COMPARE TO A NO-TILL SOIL?

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#### HEAVY MINERAL SEPARATION VIA SPIRAL PANNER: AN INEXPENSIVE, BUT EFFECTIVE ALTERNATIVE TO A TRADITIONAL SHAKE TABLE

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#### SHIFTING SANDS: PROVENANCE CHANGES IN THE NORTHERN APPALACHIAN FORELAND BASIN

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#### MAGMA CHAMBER ZONATION AND ERUPTIVE INVERSION IN THE PEACH SPRINGS TUFF: GEOCHEMICAL AND PALEOMAGNETIC EVIDENCE

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#### GPR ARCHITECTURE OF PALEO-STRAND PLAIN DEPOSITS IN NORTHEASTERN SOUTH CAROLINA

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STRATIGRAPHIC RELATIONS BETWEEN TWO VOLCANIC UNITS AND THE POSSIBLE LACUSTRINE SEDIMENTS BETWEEN THEM: IMPLICATIONS FOR THE PALEOENVIRONMENT IN TIMES GULCH, NW ARIZONA

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LUNAR EXPLORATION FOR HE-3

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SIMULATION OF STRUVITE PRECIPITATION FROM SWINE WASTE IN THE PRESENCE OF NICKEL AND ZINC

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STABLE ISOTOPIC COMPOSITION OF METEORIC WATER WITHIN CENTRAL OHIO

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REMOTE SENSING AND PALEOMAGNETISM OF THE TUFF OF BONELLI HOUSE, NW ARIZONA AND SE CALIFORNIA

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PETROGRAPHY AND GEOCHEMISTRY OF INTRACALDERA IGNIMBRITE MATRIX AND TUFF BLOCKS: IMPLICATIONS FOR ERUPTION OF PEACH SPRING TUFF AND CALDERA COLLAPSE

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HIGH RESOLUTION ISOTOPE SCLEROCHRONOLOGY REFLECTS CHANGES IN THE SEASONAL CYCLE AT ROCKY POINT, BELIZE BETWEEN THE LAST INTERGLACIAL AND PRESENT

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MODELING BACTERIA CONTAMINATION OF STREAMS IN MCDOWELL COUNTY, WV

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INVESTIGATION OF BIOCHAR FOR AMENDMENT OF A DISTURBED URBAN SOIL

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ASSESSMENT OF GARNET-GRADE METAMORPHISM AT GARNET HILL, PAULDING COUNTY, GEORGIA

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WHAT'S WEATHERING IN LA SIERRA DE LAS MINAS?

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FINDING THE ELUSIVE CATSKILL DELTA. THREE UNDERGRADUATE RESEARCH PROJECTS IDENTIFY DEVONIAN MARGINAL MARINE STRATA ON OYARON HILL, EAST-CENTRAL NEW YORK

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HUNTING FOR ULTRA-LOW VELOCITY ZONES USING SKS AND SKKS DIFFERENTIAL TRAVEL TIME RESIDUALS

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BIOSTRATIGRAPHIC AND MORPHOMETRIC ANALYSIS OF THE CALCAREOUS NANNOFOSSIL *TRIBRACHIATUS ORTHOSTYLUS* AND TWO NEW SPECIES/MORPHOTYPES OF *TRIBRACHIATUS* IN LOWER EOCENE SEDIMENTS

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DISTRIBUTION AND DEPOSITIONAL MODEL OF THE CINTA COLORADA MARKER BED OF THE COPPER-RICH BOLEO FORMATION, SANTA ROSALÍA BASIN, BAJA CALIFORNIA SUR, MÉXICO

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MINERALOGY AND FELDSPAR VARIATIONS OF SENTINEL ROCK PEGMATITE,  
PIKES PEAK BATHOLITH, COLORADO SPRINGS, COLORADO, USA

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THE EFFECTS OF SEASONAL VARIABILITY, IMPERVIOUS SURFACES, AND SOIL  
PERMEABILITY ON THE FLASHINESS OF HEADWATER STREAMS IN THE  
PIEDMONT OF NORTH CAROLINA

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XRF AND SMEAR SLIDE ANALYSIS OF COLOR BANDS IN HOLOCENE-  
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ASSESSMENT OF WATER QUALITY THROUGH THE STUDY OF THECAMOEBIAN  
POPULATIONS IN TODDS LAKE, RUTHERFORD COUNTY, TN

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AN INVESTIGATION OF THE YOUNGER DRYAS IMPACT HYPOTHESIS THROUGH  
ANALYSES OF LATE QUATERNARY LAKE SEDIMENT, LAGUNA SECA CHAPALA,  
BAJA CALIFORNIA, MEXICO

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EVALUATION OF APATITE AGE DISTRIBUTIONS BETWEEN GRAVEL AND SAND  
SEDIMENTS IN GLACIAL AND FLUVIAL DEPOSITS

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CONTROLS ON ASTEROID POROSITY: REVIEW AND NEW DATA FOR S-COMPLEX  
ASTEROIDS

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A TOPOGRAPHIC MODEL OF UPPER TERLINGUA CREEK IN WESTERN TEXAS, USA  
DEVELOPED USING PHOTOGRAMMETRIC TECHNIQUES

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CONFIGURATION OF MIOCENE BASINS ALONG THE SANTA CRUZ-CATALINA  
RIDGE, CALIFORNIA CONTINENTAL BORDERLAND

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LONG-TERM TRENDS IN STREAM DISCHARGE IN THE NORTHEAST UNITED  
STATES: EVIDENCE FOR CHANGING CLIMATE

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ANALYSIS OF FOSSILIFEROUS, VOLCANICLASTIC LIMESTONE FROM THE BASE OF  
THE UPPER MIOCENE BOLEO FORMATION OF SANTA ROSALIA BASIN, BAJA  
CALIFORNIA SUR, MEXICO

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GEOCHEMICAL ANALYSIS OF IRON AND PHOSPHOROUS IN ARCTIC TUNDRA  
SOILS

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USING REMOTE SENSING TO DELINEATE AU-PLACER DEPOSITS IN THE EAGLE A-2 QUADRANT, FORTYMILE RIVER DISTRICT, ALASKA

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MONITORING OF ROAD SALT IMPACT DURING SNOW MELTOFF AND RAINFALL EVENTS AT ALLENDALE MIDDLE SCHOOL, MICHIGAN

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CHEMICAL ZONING OF FLUORITE AND QUARTZ IN HYDROTHERMAL VEINS FROM THE LAKE GEORGE PLUTON OF THE PIKES PEAK BATHOLITH, COLORADO

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THE EXAMINATION OF HYDROTHERMAL VEIN GROWTH SEQUENCES AND THEIR CHARACTERISTIC DISTRIBUTION OF RARE EARTH ELEMENTS IN CHEMICALLY ZONED FLUORITE AND QUARTZ IN LAKE GEORGE, COLORADO

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ORIGINS AND EVOLUTION OF AMPHIBOLITES FROM THE GLADE GAP EXPOSURES OF THE CHUNKY GAL/BUCK CREEK MAFIC-ULTRAMAFIC COMPLEX, WESTERN NORTH CAROLINA

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GEOLOGIC MAPPING OF A TETHYAN OCEAN-CONTINENT TRANSITION DETACHMENT FAULT EXPOSED IN THE LIGURIDE COMPLEX OF SOUTHERN ITALY

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IN-FIELD RAPID ANALYSIS OF P: EXTENSION TO A BROAD ARRAY OF SOIL TYPES

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INVESTIGATING THE ORIGIN OF GRANITE CLASTS IN CONGLOMERATES OF THE MOUNT ROGERS FORMATION, SW VA

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EVALUATING VARIATIONS IN URANIUM, THORIUM, AND POTASSIUM CONTENT IN THE PIERRE SHALE USING NATIONAL URANIUM RESOURCE EVALUATION AERIAL GAMMA-RAY SURVEY DATA

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TURBIDITY, TOTAL SUSPENDED SOLIDS, AND E. COLI CORRELATION ON THE LITTLE TALLAPOOSA RIVER, CARROLL COUNTY, GEORGIA

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GEOCHEMICAL AND PETROLOGICAL CHARACTERIZATION OF MIGMATITE AND RESTITE IN THE WET MOUNTAINS, COLORADO

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U-PB AGES OF DETRITAL ZIRCONS IN QUARTZ ARENITES OF THE ORDOVICIAN BLOUNT MOLASSE, SOUTHERN APPALACHIANS, USA

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THE CARBON BALANCE BEHAVIOR OF CALIFORNIA GRASSLANDS AS REPRESENTED BY JASPER RIDGE

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DISTINGUISHING MIOCENE MYLONITIZATION FROM LATE CRETACEOUS–EARLY TERTIARY MYLONITIZATION IN THE HARCUIVAR MOUNTAINS METAMORPHIC CORE COMPLEX, WEST-CENTRAL ARIZONA

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BRITTLE FAULTING IN THE SOUTH MOUNTAINS METAMORPHIC CORE COMPLEX, PHOENIX, ARIZONA: EVIDENCE FOR DISTRIBUTED DEXTRAL SHEAR ASSOCIATED WITH THE PACIFIC – NORTH AMERICAN PLATE BOUNDARY

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