PITTSBURGH GEOLOGICAL SOCIETY

ROCKS, ROOTS AND RATTLESNAKES

A Geologist's Journal: 150 Days of Discovery on the Appalachian Trail

Craig A. Eckert

Geologist & Author
Retired Geoscience Advisor

Please RSVP by Wednesday, December 7

December 14, 2022

MEETING TIMES

Social Hour	5:30 PM
Dinner	6:30 PM
Speaker	7:30 PM

DINNER COSTS

$75.00 each

dress attire

business (suit/tie)

formal (black tie)

**tie required – formal attire preferred*

RESERVATIONS

Email your name and number of attendees to: pgsreservations@gmail.com

Or reserve and use PayPal: https://www.pittsburghgeologicalsociety.org/

MEETING LOCATION

LeMont Restaurant
1114 Grandview Ave.
(Mt. Washington)
Pittsburgh, PA 15211

COVID19 POLICY

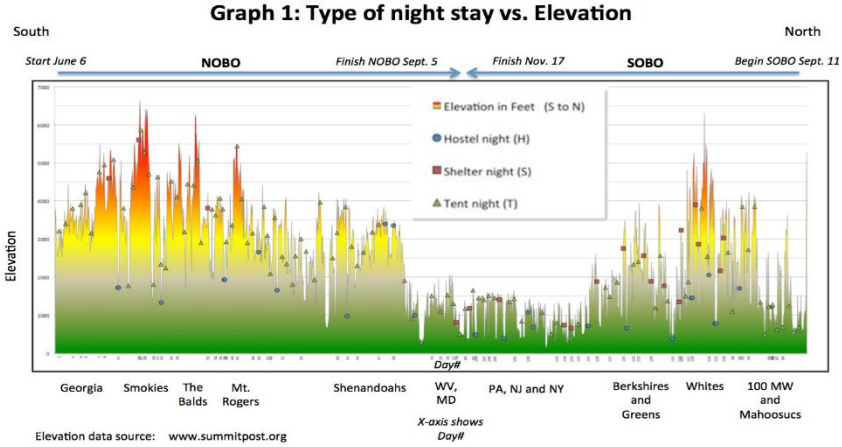
See page 4 for current guidance.

Speaker Abstract

In 2020 I spent five and one-half months thru-hiking the Appalachian Trail. I began my northbound trek on June 6 at the southern terminus—Springer Mountain, Georgia, arriving at Swatara Gap, Pennsylvania, in early September, roughly at the half-way point. From there I "flip-flopped" to Maine where I hiked southbound for another two months, finishing my thru-hike at Swatara Gap on November 17.

Following this solo trek, I wrote a book about my adventures and encounters along the way, written as a series of daily logs originally transcribed from my daily journals, then embellished with additional details resulting from further recollection and research. As a geologist, I added a fair amount of content pertaining to the rocks I encountered, their geologic history and relevance to the present trail. Some of the content I was already familiar with or already knew, some I relearned from review of maps and literature sources, and still some content I was learning about for the first time. I have woven those explanations and observations into stories about my daily experiences. Most of my background as a petroleum geologist has been in studying sedimentary basins, and most of the rocks encountered along the trail were, well, not sedimentary. Metamorphic and igneous rocks such as those found in the Blue Ridge and New England are far more prevalent and provided an enjoyable re-learning experience for me. During my career, one of my pet research areas was searching for evidence for reactivation of faults in the basement complex below the Appalachian sedimentary basin, which affected depositional patterns and later structural development throughout the Paleozoic era. This was one of my favorite topics in geology and involved the use of many types of geophysical datasets as well as massive amounts of well-log data in order to image, model, and interpret deep crustal faults in the metamorphic and igneous basement complex. Those deeply buried basement rocks I had spent so much time studying and mapping were the same rocks under my feet throughout most of the Blue Ridge physiographic province from Georgia to Pennsylvania. As I walked each day on nearly every imaginable kind of rock over the almost 2,200 miles, the surrounding geology was always on my mind. It is woven into the fabric of the text of my book. I have combined an assortment of published trail data with analyses of my own data collected over my 150 days. Using Excel and its regression analytics, I looked for correlations between multiple parameters collected along the way and used graphics to highlight various aspects of my journey. Lastly, I hope readers find my occasional meanders into "rock-think" both entertaining and informative. Seeing and touching the rocks at the surface is akin to just seeing the above-water tip of the iceberg.

Graph 1: Type of night stay vs. Elevation



Speaker Biography

Craig Eckert is a retired Geoscience Advisor since 2017, following a 38-year career in the petroleum industry. He worked for the last 18 years of his career for EQT Production Company in Pittsburgh, PA. He has more than 30 years of seismic interpretation and prospect generation experience in the industry, having worked both domestic and international oil and gas plays. Graduating with a BS in Geology from WVU in 1979, Craig began his career with Consolidated Gas in WV, and then went on to work for CNG Development Company, Ashland Exploration, and EQT, as well as several smaller independents. In his career he has drilled over 1000 wells, made significant discoveries, and was responsible for the first horizontal well drilled in Virginia. In 2020, Craig thru-hiked the Appalachian Trail over a period of 5 1/2 months. Following this, he wrote a book about his adventures in the form of a daily trail log, and from the perspective of a geologist. He is an active member of AAPG, AIPG, SEG, GSA, is a Certified Petroleum Geologist (AAPG/DPA), and Certified Professional Geologist (AIPG) and has served as President of Eastern Section AAPG, Geophysical Society of Pittsburgh and Pittsburgh Geological Society. He served on the AAPG Advisory Council and is the recipient of numerous ES-AAPG awards, including the Ralph L. Miller Best Paper Award (2003), Distinguished Service Award (2016), and Presidential Award (2018).

You and your guests are cordially invited to attend a
*PGS sponsored **FORMAL PGS** dinner meeting*
to be held on December 14, 2022
at

LeMont Restaurant
1114 Grandview Avenue
Pittsburgh, Pennsylvania

Social hour starting at 5:30 p.m. o'clock
featuring Craig Eckert, author of "Rocks, Roots and Rattlesnakes"
and his journey on the Appalachian Trail

LeMont is going all out to provide the finest meal that they have to offer.
All of the following are provided for $75/person (plus cash bar)

Butler-provided Appetizers:

1. Maryland Style Crab Cake
2. Spanakopita
3. Roasted Meatballs, Jack Daniels Glaze and Fresh Cilantro
4. Smoked Scottish Salmon Canapé, Herb Cream Cheese
5. Bruschetta with Fresh Tomato, Basil and Feta in Tuscan Round (Stationary)
6. Crudite and Cheese Station (vegetable tray)

Buffet Main Course:

1. Caesar salad
2. Carved roast filet mignon with sauce bordelaise
3. Carved roast turkey breast
4. Grilled filet of salmon with a dill-dijon sauce
5. Cheese tortellini marinara
6. Penne primavera alio olio with roasted vegetables

Desert Table:

1. Coffee
2. Mini pastries
3. Fresh fruit platter

Formal attire
Please make this a special occasion by wearing your finest

Please note that PGS is monitoring the COVID-19 situation closely and will continue to modify policy based on the recommendation of national and local experts. We ask that our members please consult and follow the US Centers for Disease Control and Prevention (CDC) recommendations for Allegheny County as shown here: https://www.cdc.gov/coronavirus/2019-ncov/your-health/covid-by-county.html

UPCOMING PGS MONTHLY MEETINGS

Meeting Date	*Scheduled Speaker*	*Presentation Topic*
December 14, 2022*	Craig Eckert	"Rocks, Roots and Rattlesnakes: Walking the Appalachian Trail"
January 19, 2023	Joint PGS-AEG-ASCE mtg Jim James	"Montgomery Locks and Dam Subsurface Investigation"
February 15, 2023	Darcy Lecture: Dr Alicia Wilson	"Subseafloor Hydrogeology: Moving beyond Watersheds"
March 15, 2023	Dr. Peter Dodson University of Pennsylvania	"Collecting Dinosaurs on Four Continents"
April 19, 2023	Student Night	
May 10, 2023	2021 ES AAPG Winner of PGS Best Presentation on Appalachian Geology: James McDonald	"History of Structure Contour Mapping in the Appalachian Basin: 1870-1917"

* *December meeting will be held at LeMont Restaurant on Mt. Washington*

The Pittsburgh Geological Society welcomes our new members:

New Regular Members:

Christopher L. Haga, Geotechnical Engineering Coordinator,
Dawood Engineering, Inc., Bridgeville, PA

Tyler C. Furr, Part-time Faculty, Montgomery College, Frederick MD

New Student Member:

Roman D. Giachetti
PennWest California

PRESIDENT'S STATEMENT

Hello again PGS members! Thank you to all of those who attended our October meeting. It was great reconnecting with Dick Smosna and Kathy Bruner and their cave-art talk was wonderful and full of fascinating imagery.

It will be a tough act to follow but I'm sure Craig Eckert will rise to the occasion as the speaker for our annual December partners night meeting. This year's December meeting will be extra special since it is scheduled to take place at LeMont Restaurant atop Mt. Washington. Remember to get your RSVPs in early since the December meeting is always a week earlier than usual and this year is no exception. The meeting is scheduled for Wednesday, December 14th so get your calendars updated and visit the website to confirm your reservation. Also note that because this is a formal affair, ticket prices will be $75 per plate and formal attire is required. I'm certainly looking forward to seeing everyone in their finest and to a formal outing with spectacular food. Craig's talk about his experience hiking the Appalachian Trail should also be fantastic and I can't wait to hear his story and to see pictures from the adventure.

As a final comment, PGS is initiating its 2023 Corporate Membership Drive so if you've ever considered becoming a corporate sponsor, now is the time! Our corporate sponsors enjoy special advertising space for job postings and recognition at the top of the PGS website and in the monthly newsletter. Corporate membership runs from January through December annually and during 2023, as a corporate member, you may designate one individual from your company who will have all the rights and privileges as a voting member of the Society.

Thanks again to all of our current sponsors!

Dan

LOCAL GEOLOGICAL EVENTS

The Ohio Geological Society (OGS)

December 1, 2022 **talk begins at 1:00 PM**

Lunch Symposium: "Geological Carbon Capture and Storage Commercialization in the Midwest U.S. An overview of CCUS and factors that influence the decision-making process from a project perspective" by Evan Zeller, Battelle Carbon Services.

Details and registration: https://www.ohiogeosoc.org/events/geological-carbon-capture-and-storage-commercialization-in-the-midwest-u-s/#tkt-slctr-tbl-7455

in-person at **Hilton Doubletree, 175 Hutchinson Ave, Columbus, OH 43235**

AMERICAN ASS'N DRILLING ENGINEERS (joint AADE/GSP/PAPG/SPE/WEN/MUG event)

December 15, 2022 **6:00 PM - 10:00 PM**

OILFIELD CHRISTMAS BALL *semi-formal attire*

Details and registration: https://aade.app.neoncrm.com/np/clients/aade/event.jsp?event=79&

in-person at **Bella Sera, 414 Morganza Rd, Canonsburg Pa 15317**

GEOPHYSICAL SOCIETY PGH / PGH ASS'N PETROLEUM GEOLOGISTS (PAPG & GSP)

January 10, 2023 **5:00 PM - 7:00 PM**

GSP/PAPG NEW YEAR SOCIAL: Members enjoy good conversation, networking and up to two free beers

Details and registration: https://www.thegsp.org/event-5035961

in-person at **Penn Brewery, 800 Vinial St, Pittsburgh, PA 15212**

PENNSYLVANIA COUNCIL OF PROFESSIONAL GEOLOGISTS (PCPG)

January 12, 2023 **1:00 PM – 2:00 PM**

Webinar: "Ethics for Geoscientists" Russell Losco, P.G., C.P.S.S., Lanchester Soil Consultants, Inc.

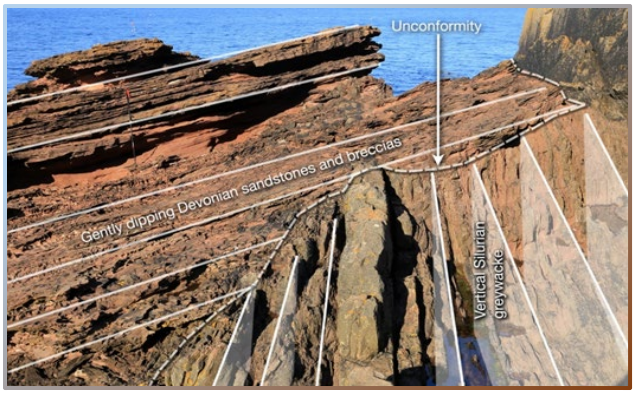
Details and registration: https://pcpg.org/event-4972405

THE ORIGIN OF WESTERN PENNSYLVANIA PLACE NAMES

Zambelli fireworks light up the Pittsburgh skyline following a Pirates game. The Zambelli Fireworks originated and still operates out of New Castle, Lawrence County, PA.

In 1798 when a civil engineer named John Carlysle Stewart traveled to western Pennsylvania to resurvey some land set aside to pay Revolutionary War veterans for their service, he found that the original survey had not included about 50 acres of land at the confluence of the Shenango River and Neshannock Creek. This was originally a Native American town called Kuskusky. Stewart claimed the land for himself and in April 1798 laid out the beginnings of a village. In 1825, that land became the Borough of New Castle with a population of about 300. New Castle began to flourish with the construction of the Beaver and Erie Canal system, prompting numerous manufacturing companies to build plants because of the combined convenience of transportation facilities and access to raw material markets. Railroads later replaced the canal system, and New Castle grew to become a city in 1869 with a population of about 6,000. By 1900, the city's population had grown from 11,600 in 1890 to 28,339; soon New Castle was one of the fastest-growing cities in America. During the first half of the 20th century, New Castle became known as both the "hot dog capital of the world" and the "fireworks capital of America." The Zambelli Fireworks, which was founded in New Castle, is one of the world's leading fireworks and pyrotechnics companies, and is still featured at presidential celebrations, Pittsburgh Pirates games, and even the Super Bowl.

DID YOU KNOW . . . ?



Photo, with interpretation, of Siccar Point in Scotland where, in 1787, James Hutton discovered the Devonian Old Red Sandstone lying atop a Silurian graywacke. This was his proof "that we find no vestige of a beginning, no prospect of an end." Siccar Point Hutton's Unconformity was the first Geosite designated by the IUGS.

At its 60th Anniversary conference at the UNESCO Global Geopark in Spain in September, the International Union of Geological Sciences (IUGS), one of the World's largest scientific organizations, announced that 100 sites around the world have been chosen as the first for induction into the IUGS Geological Heritage Sites, a kind of Hall of Fame for geologic features. The presentation of the first 100 Geosites, as they are called, initiated an attempt to designate geological sites from across the globe that the entire geoscience community recognizes for their impact in understanding the Earth and its history. They are significant locations exhibiting geological elements and/or processes of international scientific relevance as well as those representing a significant role in the development of the geological sciences through history and understanding of the Earth. Siccar Point Hutton's Unconformity in Scotland was the first site designated for obvious reasons. Among the other designations were the Cretaceous to Paleogene Stratigraphic Section of Bottaccione Gorge, Gubio in Italy where Luis Alvarez found the K-Pg boundary iridium anomaly, the Jurassic Solnhoffenn – Eichstätt *Archaeopteryx* Seriall Site

in Germany, the Mohorovičić Discontinuity at Gros Morne National Park in Canada, Uluru Inselberg (commonly called “Ayers Rock”) in Australia, and the Burgess Shale Cambrian Palaeontological Record in British Columbia, Canada. Eight of the 100 sites are located in the US. They include:

- ✓ The Great Unconformity at the Grand Canyon
- ✓ The Late Quaternary Asphalt Seeps and Paleontological Site of La Brea Tar Pits
- ✓ Archean Rocks of the Eastern Beartooth Mountains of Montana
- ✓ The Stillwater Complex in Montana
- ✓ The Yellowstone Volcanic and Hydrothermal System
- ✓ The Northern Snake Range Metamorphic Core Complex in Nevada
- ✓ The Grand Canyon
- ✓ Dry Falls and the Channeled Scabland in Washington state.

It should be noted that the La Brea Tar Pits is the only Geosite designated so far that is located in an urban area.

https://iugs-geoheritage.org/designations/

Researchers from Purdue University recently made a dramatic breakthrough in chemistry and biology when they discovered a mechanism for peptide-forming reactions occurring in water, something that has stumped scientists for decades. The importance of this discovery is that it is basically the chemistry behind the origin of life. The research is the first demonstration that simple amino acids spontaneously form peptides, the building blocks of life, in drops of pure water. Water-based chemistry such as this, which leads to proteins and eventually to life, could also help in the quicker development of medicines to treat our most devastating diseases. Scientists have hypothesized for decades that life on Earth began in the oceans, but the chemistry that could help confirm it had remained an enigma. Raw amino acids such as those delivered to Earth on a daily basis by meteorites can react and fasten together to form peptides. The process requires the loss of a water molecule, which seems remarkably improbable in a wet, aqueous, or oceanic environment. In other words, in order for life to form on Earth, it needed water, but it also needed some distance away from the water for the

A team of chemists has discovered the secret to the origin of life in droplets of water.

peptides to form. The research team found the answer to this conundrum – water isn’t wet everywhere! At the interface where a water drop meets the atmosphere, very quick reactions can take place, transforming abiotic amino acids into the building blocks of life. So, the researchers speculate, fertile landscapes for life’s potential origin were places where sea water sprays into the air, or where fresh water flows down a slope. The chemists used mass spectrometers to examine chemical reactions in water droplets and discovered that the rates of reactions in droplets range from a hundred to a million times faster than the same chemicals reacting in bulk solutions, making catalysts unnecessary. The secret of how life emerged on Earth can help scientists better understand why it happened and guide their search for life on other planets, or even moons. Understanding how amino acids built themselves up into proteins and, eventually, life itself changes scientists’ understanding of chemical synthesis. Even better, that same chemistry may potentially help synthetic chemists identify and create novel medications and therapeutic treatments for illnesses by accelerating key processes. Typically, synthetic chemistry experiments are so slow that they require days or weeks to run. Now, the new discovery shows this isn’t necessary. Using droplet chemistry, the research team built an apparatus to speed up the synthesis of novel chemicals and potential new drugs. Ain’t science marvelous?

https://scitechdaily.com/the-fountain-of-life-scientists-uncover-the-chemistry-behind-the-origin-of-life/

New research has indicated that at least two genetically distinct groups of humans lived in Britain at the end of the last Ice Age. Ice sheets that covered large areas of the British Isles were melting around 19 ka ago, allowing the landscape to become habitable to humans again according to evidence from human remains dating back to about 15.5 ka ago. These early human groups crossed from mainland Europe on land that is now submerged. Evidence of human habitation from the late Pleistocene have been found at just a few sites in Britain, including at Gough's Cave in Somerset, which was home to "Cheddar Man," an individual who lived about 10 ka ago, and some older remains showing signs of cannibalism. Kendrick's Cave in Llandudno, Wales, has also yielded some ancient human remains. Now, a team of researchers has extracted and analyzed DNA from a pair of individuals from these sites, the oldest DNA so far found in Britain. Their analysis showed that there were two distinct genetic ancestries in Britain during the late Pleistocene, something the researchers were not expecting. They used isotope analysis on the remains, allowing them to determine the influence of different food sources in their diet that helped them refine the radiocarbon dating. The team's work supported previous research that indicated the Gough's Cave individual's diet consisted mainly of terrestrial animals whereas the Kendrick's Cave individual included marine life in his diet. After that, the researchers analyzed nuclear and mitochondrial DNA from the two individuals. They discovered that the remains from Gough's Cave were from a female who lived about 14.9 ka ago and had been cannibalized. DNA analysis indicated she shared ancestry with an individual from a cave in Belgium who had lived 15 ka ago. This particular ancestry was linked to groups that had expanded from south-west Europe, based on particular types of stone tools, treatment of the dead, cave art, and other practices that have been labelled Magdalenian culture. Some Magdalenian-style artefacts had also been found at Gough's Cave. Kendrick's Cave also contained a Magdalenian-style stone tool and a cut bovid bone from about the same time as the Gough Cave female, but DNA analysis of the Kendrick's Cave individual indicated a different ancestry. This individual, a male who lived about 13.5 ka ago, shared ancestry with 14 ka-old remains from

An engraved human bone from Gough's Cave, Somerset, England. This is one of the oldest human bones found in Britain.

Villabruna in northern Italy that were associated with western hunter-gatherers who expanded from south-east Europe or the near east. This suggests that Kendrick's Cave may have had multiple occupations. The results of the study suggest that at least two different human groups, with different ancestries, diets, and cultures, including funerary practices, were present in Britain at the end of the Pleistocene. Caution should be applied to the interpretation of the data, however, because only two individuals were studied. This new research highlights the power of DNA analysis of human remains to help determine whether abrupt changes in prehistoric culture were caused by population movements and ruptures, or by the spread of ideas. In this case, it suggests that the former occurred. It added evidence to the idea of small, ecologically fragile human groups spread thinly across late Pleistocene Europe.

https://www.theguardian.com/science/2022/oct/24/uk-two-genetic-groups-humans-last-ice-age-dna-reveals

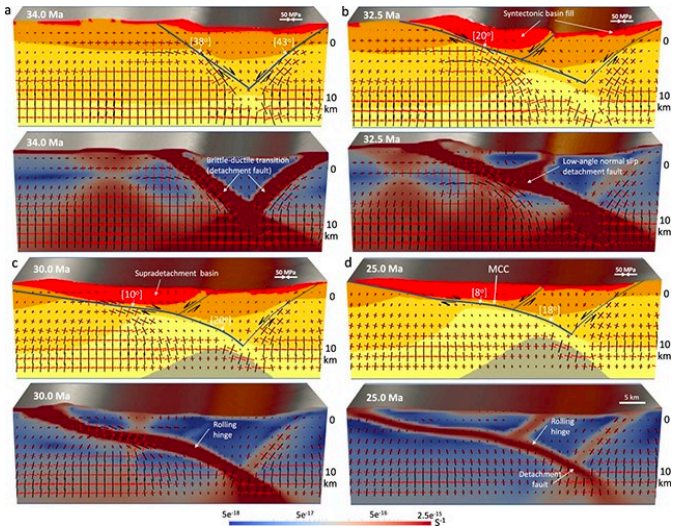
The International Energy Agency (IEA) recently published its annual World Energy Outlook that emphasizes major changes underway in the global energy system. This year, IEA has projected there will be a conspicuous peak in the consumption of fossil fuels during the 2020s based on the international community's existing energy and climate policies. Although IEA sees clear signs of change in fossil fuel use, as of now the trends don't indicate there is a change in the pattern of fossil fuel use that would suggest that the world is on the path to meeting the Paris Agreement goal of limiting global warming to 1.5°C above pre-industrial levels. IEA's projections were based largely on lower estimates of the demand for gas. Based on a mix of policy, market, and technology

The International Energy Agency projects that global fossil fuel consumption will peak this decade.

driving the trend, they are projecting the demand to reach a plateau by the end of the decade. Current higher gas prices are being spurred by the war in Ukraine, the increasing cost-competitiveness of renewable energy resources, and more robust low-carbon energy and efficiency policies, including the European Union's response to the Russian attack on Ukraine. IEA also projects that global oil consumption will peak in the mid-2030s before declining, and global coal demand will reach a high point within a few years and fall back more quickly than in previous analyses. Fossil fuels' share of the worldwide energy mix will fall sharply in the coming decades, but will remain slightly above 60% of total energy consumption in 2050. This projection is expected to bring a global temperature increase of 2.5°C by 2100, well beyond the main Paris target of 1.5°C, which is a benchmark for avoiding some of the most threatening climate problems. Still, it is a better outcome than was projected just a few short years ago. Renewed gains in technology and pushes in policy made in the last seven years have decreased long-term temperature increase by about 1°C. If the world's nations actually carry out the cutting of CO_2 emissions they've pledged, IEA thinks we can get the long-term temperature rise to 1.7 °C. But, as the report warns, *it is easier to make pledges than to implement them*.

https://www.axios.com/2022/10/27/fossil-fuel-consumption-peak-iea

Earth is the product of gravity, developing over time as, little by little, the bulk of dust and rock attracted enough other matter to form the large ball of rocks and minerals we now call home. And gravity continues to shape Earth from within even now in more delicate ways than we might envision. Now, in a new study a team of researchers suggest that even slight gravitational effects from structures lying deep within the planet can have profound consequences for the planet's crust above. The researchers compare this to the large underwater mass of ice in an iceberg. It generally isn't visible to those of us on the water's surface, but it still plays an important part in the structure and shifts that occur near the top of the iceberg. These deep gravitational shifts within the planet can create some impressive faults movement in Earth's crust, resulting in collapsed mountain belts and exposed metamorphic core complexes that had been buried as deep as 15 miles. Scientists previously attempted to determine the mechanisms behind metamorphic core complex formation, but the circumstances of their development remained a mystery. The research team studied metamorphic core complexes near Phoenix and Las Vegas and identified major geological processes to explain their formation, confirming these features seem to be the remains of collapsed mountain belts. By using computer modeling of probable landscape development over time, they determined that the primary control for the formation of metamorphic core complexes appears to be thickening, followed by weakening, of their crustal roots. The roots form where the crust thickens and intrudes into the mantle beneath a mountain range. Weakening possibly occurred through heat, fluid movement, and rock melt, causing the thickened mountain roots to collapse, thereby distorting the layers of crust below and exposing the surface of metamorphic core complex as a domed upwarp. The researchers suggest that mylonites represent traces of the turbulent formation of these



Computer models used to identify gravitational forces at work in the origin of metamorphic core complexes.

complexes. The researcher's models suggest that the extensional collapse is the result of gravity's effect on the different densities of material in the crust and mantle. This new research could change our understanding of the history of Earth and envisage how our knowledge of geology could evolve as gravity affects the crust. The researchers also think their modeling approach could assist geologists globally in understanding mountain ranges where their roots have thickened and partially collapsed. They believe their findings probably explain the many ancient gneissic domes exposures around the world, places where the brittle cover most likely was removed by erosion, thereby revealing the core of the uplifted metamorphic dome.

https://www.sciencealert.com/gravity-is-still-shaping-earths-surface-from-deep-within-new-study-finds

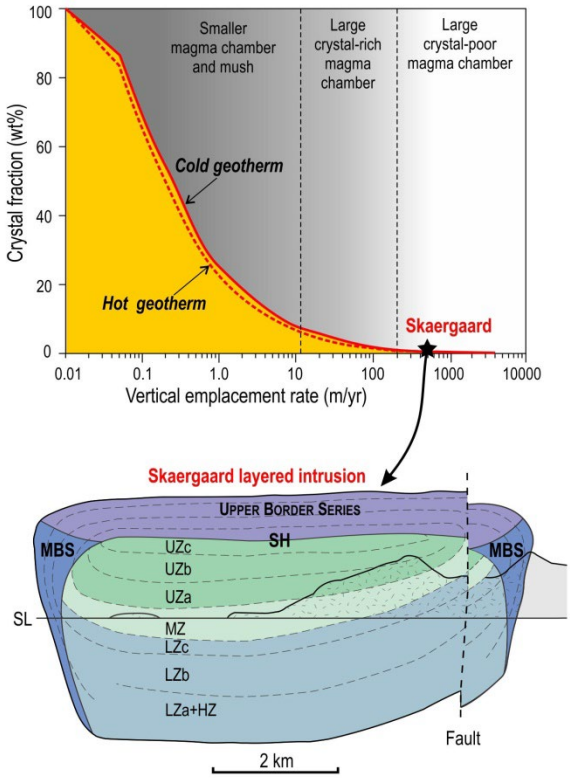
A team of aquatic researchers has discovered the Maldives archipelago, a chain of 26 coral atolls southwest of Sri Lanka and India, is an oasis for deep ocean life in a large watery desert. The so-called Nekton Maldives Mission is the first study to systematically map the deep waters of the Maldives. During a recent submersible mission around the Satho Rahaa deep-water seamount, they discovered a new kind of flourishing ecosystem that had never been described previously. Called "The Trapping Zone," it is a world where large fish assemble to eat microscopic life forms up to 7 inches in size that are otherwise similar to zooplankton, called micronekton. As the Sun rises each morning, the micronekton swim downward from the surface. Near the sunken seamount, however, the 60 ma volcanic ridges and reefs stop them from diving deeper than about 1,650 feet. They become trapped by the topography and become sitting ducks for larger predators such as tuna, sharks, and other deep-water fish that live in the zone. The research team discovered not only great numbers of fish, but great diversity as well. They turned the submersible's light on tiger sharks, gill sharks, gulper sharks, scalloped hammerhead sharks, silky sharks, sand tiger sharks, and even relatively rare bramble sharks. If an ecosystem such at that exists in the Maldives, it probably exists on other oceanic islands with similar underwater structures. It is possible that seamounts and submerged volcanoes

As submersible glides past a seamount in the Maldives.

are hotspots for deep-sea life because of the way they ensnare micronekton. The vertical movement of fish through the ocean each day is believed by some the largest mass migration on Earth. Although the fact that both zooplankton and micronekton appear to be the primary life forms in this migration, and micronekton make up a very large portion of the biomass in oceanic environments, their migratory behavior is not nearly as well understood as that of zooplankton. During their up-and-down migrations, micronekton constitute an overlooked food web for ocean ecosystems globally. Some estimates place all the world's micronekton weighing over 10 billion metric tons, 45 times heavier than all the humans on the planet, yet most of the data we have on micronekton comes from research done in the 1960s and 1970s. Only recently has this amazing group of creatures begun to receive more attention from the scientific community. Because Micronekton are tiny enough to slip through fishing nets, they are not hunted commercially. But many fish species important to the fishing industry such tuna depend highly on micronekton, which makes additional research on the little creatures even more compelling. Thus, the Trapping Zone is a distinct new ecosystem that could provide scientists the opportunity to study these overlooked organisms in a new way, and possibly allow for better ocean conservation practices. It has created an oasis of life in the Maldives, and it probably exists in other oceanic islands as well as on the slopes of continents. Unfortunately, recent climate reports suggest that some micronekton, such as krill in Antarctica, are having trouble coping with climate change. If they disappear, other fish, mammals, and birds are likely to follow.

https://www.sciencealert.com/hidden-oasis-of-life-discovered-deep-under-the-ocean-in-the-maldives

An international team of researchers recently discovered that basaltic magma chambers can grow at incredible speeds, from months to years in time, making them the intrusive counterparts of caldera-forming volcanic eruptions within the Large Igneous Provinces. The vertical rate magma chambers grow through magma emplacement had been highly debated. Based on very precise zircon dating and measurements of surface deformation, most of Earth's plutons presently are considered to have been formed very slowly, on the order of a few centimeters per year. These slow rates, however, are incompatible with what is known about large, well-defined intrusions that seem to have formed at very high emplacement rates. A key question the research team attempted to tackle was which rate of magma emplacement would be needed in order to keep the growing chamber completely molten. They attempted to answer this question using the well-known Skaergaard intrusion in Greenland. This geologic feature began crystallizing from the margins inwards, but only once it had completely filled with virtually crystal-free magma. This gave the researchers the rare chance to estimate the smallest rate of magma emplacement required to keep the Skaergaard magma in a largely molten state, i.e., with less than 1% crystals, while developing to its current size. They used numerical simulations to compute the conditions that would be necessary for the formation of the intrusion and discovered that it had to have occurred within a few decades, if not months or even weeks. The vertical rates of growth would have been in the hundreds or thousands of meters per year, meaning that volumetric flow rates would have been in the tens to hundreds of km^3/year. The volumetric flow rate feeding the intrusion would have to have been several orders of magnitude greater than the currently recognized growth rates of basaltic magma chambers.



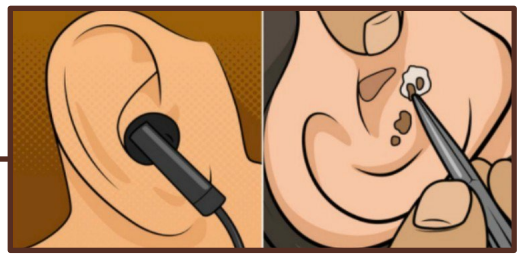
Numerical simulations have been used to indicate that the minimum vertical emplacement rate for Greenland's Skaergaard magma chamber is on the order of only a few 100s or 1000s of meters per year.

https://scitechdaily.com/catastrophically-fast-basaltic-magma-chambers-grow-far-faster-than-expected/

WEBSITE OF THE MONTH

https://ucmp.berkeley.edu/quaternary/ple.html

Fun Fact Having Nothing to Do with Geology



Wearing headphones for just an hour could increase the bacteria in your ear by 700 times.

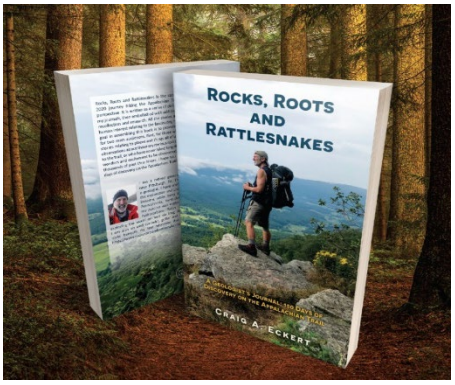
YOU CAN STILL ORDER YOUR OWN PGS SWAG!

Show off your PGS Membership by purchasing a hoodie, t-shirt, or bumper sticker at the new PGS merchandise store. All proceeds support geology student participation in PGS society meetings!

https://apparelnow.com/pittsburgh-geological-society-apparel

LISTEN TO CRAIG'S ADVENTURES AT THIS MONTH'S PGS MEETING AT MT. WASHINGTON'S LE MONT RESTAURANT!

READ A BOOK WITH A LOCAL GEOLOGY CONNECTION!



In *Rocks, Roots, and Rattlesnakes*, Craig reflects on the sedimentary, igneous, metamorphic and tectonic history of our favorite local mountain chain, weaving an assortment of published data with his own geologic observations. Craig Eckert's book makes a great holiday gift for a geologist or a future trail hiker. Purchase thru Craig's website: https://www.rocksrootsandrattlesnakes.com/

PITTSBURGH RED BED AMBER LAGER

If you missed the release party at #mindfullbrewing you can pick up a glass at our #pittsburghgeologicalsociety meetings while supplies last!

Four packs and drafts can be picked up at the brewery!

A portion of the proceeds from the "Pittsburgh Red Bed" release supports the Galey Fund of PGS - dedicated to supporting scholarships and professional development initiatives for our student members.

https://www.mindfulbrewing.com/

a collaborative effort between PGS & Mindful Brewing

PGS 2022-2023 Officers and Board of Directors

President	Vice President	Treasurer	Secretary
Dan Harris	Peter J. Hutchinson	Kyle Fredrick	Diane Miller

Directors-at-Large (2nd year)	Directors-at-Large (1st year)	Counselors
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Wendy Noe	Ray Follador	Charles Shultz
Nancy Slater	Erica Love	

Newsletter Editor	Continuing Education	AAPG Delegates
Robin Anthony	Brian Dunst	Dan Billman / Ray Follador
Webmaster	**Archivist**	**Student Representative**
Dan Harris	Mary Ann Gross	Jasmine Davis, PennWestCalU

Officer Contacts: If you wish to contact a PGS Officer, you can email Dan Harris, President at harris_d@pennwest.edu; Pete Hutchinson, Vice-President at pjh@thggeophysics.com; Kyle Fredrick, Treasurer, at fredrick@pennwest.edu; or Diane Miller, Secretary, at dianemiller123@msn.com.

Memberships: If you have not yet renewed your membership, be aware that PGS is making the entire process digital. You will no longer be receiving a membership form as in the past. Now you will only need to go to the PGS website's Membership page at https://pittsburghgeologicalsociety.org/existing-member-renewal-instructions.html and fill in the boxes with a red asterisk (*). And, as usual, you can pay your dues through the website www.pittsburghgeologicalsociety.org

If you know of anyone who is not a member who would like to become one, let them know that they just need to go to https://pittsburghgeologicalsociety.org/new-membership-instructions.html and fill in the boxes marked with that ubiquitous red asterisk. And again, they can pay through the website.

If you have any issues with the forms, you should contact Webmaster Dan Harris, at harris_d@pennwest.edu. If you have any questions about PGS membership, contact Membership Chair John Harper at jharper.pgs@gmail.com.

For more info on **PGS**, please visit our website: www.pittsburghgeologicalsociety.org.

Programs: If you would like to make a presentation at a PGS meeting or have a suggestion for a future speaker, contact Pete Hutchinson, Program Chair at pjh@thggeophysics.com.

Newsletter: To contact the Newsletter Editor, Robin Anthony, with questions or suggestions for articles, job postings or geological events, please email robanthony@pa.gov

Facebook: Follow the PGS at https://www.facebook.com/PittsburghGeologicalSociety

Twitter: PGS can be followed on Twitter by searching out the username @PghGeoSociety

LinkedIn: To join the PGS Group, click https://www.linkedin.com/groups/12018505

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