



EARTHQUAKE

e-Newsletter about what's movin' and shakin' at the Earth Science Museum

Earth Science Museum, 3215 W. Bethany Home Rd., Phoenix, AZ 85017
www.earthsciencemuseum.org, scote@earthsciencemuseum.org, 602-973-4291

July 2021
Volume 10, Issue 7

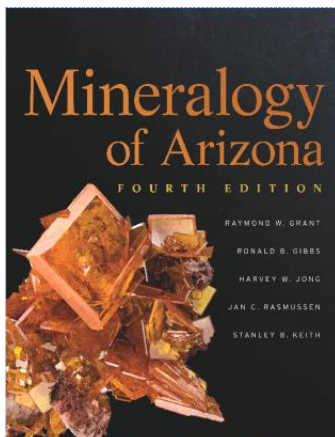
ESM OUTREACH UPDATE

Mardy Zimmermann, Outreach Coordinator

I met with DaNel Hogan on July 28, 2021, to transfer the remaining 150 rock bags for the Marana School District curriculum project.

This month we spent some time collecting brachiopods for children's education for the Payson Rimstones Rock Club's upcoming show September 17-19, 2021, at the Mazatzal Hotel & Casino in Payson, AZ.

Richard and I will give a presentation on fluorescence at this year's 28th Annual Flagg Mineral Foundation's Minerals of Arizona Symposium. Also, Dr. Ray Grant, ESM board member, will have a presentation on the 4th Edition of *Mineralogy of Arizona* which he and Harvey Jong, ESM board president, Jan Rasmussen, ESM member and former AZ Mining and Mineral Museum curator, Ron Gibbs, a mineral collector and retired mining engineer, and Stanley B. Keith, a geologist involved with research on mineral deposits and their associated igneous rocks, have been working on.



Cover design University of Arizona Press, copyright 2021

The symposium will once again have a three-day format that will include mineral sales, lectures, and a variety of other mineral related events. The symposium is scheduled for September 24th, 25th and 26th, 2021 and will take place at the [UArizona Alfie Norville Gem and Mineral Museum](#), 115 N. Church Ave, Tucson, AZ, 85701.

The 2021 symposium theme will be "*Daylight and Fluorescent Minerals*".

Seating is limited to 100 attendees and registration ends on September 5th, 2021.

28th Annual Minerals of Arizona Symposium

Friday September 24th, Saturday September 25th, and Sunday September 26th, 2021
Sponsored by the Flagg Mineral Foundation

"Daylight and Fluorescent Minerals"

to be held at the
UArizona Alfie Norville Gem and Mineral Museum
115 N. Church Ave., Tucson, AZ 85701

Saturday Program to include the following speakers:

7:45-8:30 AM – Registration & Check-in

8:30 AM to 5 PM – Program to include (with coffee breaks, snacks and lunch provided)

The University of Arizona Alfie Norville Gem and Mineral Museum – Brief Overview

The Significance of Donations to Museums

Fluorescence and the Zimmerman Collection

Gallagher Mine and other Vanadium Localities

around Charleston / Tombstone

Five Decades of Mineral Collecting in New Mexico

The World's Largest Silver Nugget

Minerals in the Movies

Laser Fluorescence

Mineralogy of Arizona, 4th Edition

Fluorescent Petrified Wood, Who Knew?

Eric Fritz

Anna Domitrovic

Mardy and Dick Zimmermann

Barbara Muntyan

Mike Sanders

Chris Osterman

Dr. Wendell Wilson

Tom Kaye

Ron Gibbs & Dr. Ray Grant

Mike Fleeman

There will be mineral sales by the Flagg Mineral Foundation during the day on Saturday

Saturday Evening Activities:

TBD

Sunday Activities:

TBD

Go to flaggmineralfoundation.org for the latest information.



Arizona Rocks 98

Text by Ray Grant

Last month, I told you about seeing dinosaurs in Springerville. If you are headed to that area to beat the heat here is a reference for you to check out: *A Guide to the Geology of the White Mountains and the Springerville Volcanic Field, Arizona*, Arizona Geological Survey Down-to-Earth 16, (2003), by John Bezy and Arthur Trevena. You can find this publication at

http://repository.azgs.az.gov/uri_gin/azgs/dlio/1536 and click on title or directly at http://repository.azgs.az.gov/sites/default/files/dlio/files/nid1536/dte-16_400dpi.pdf.

There are 26 geologic features in the guide and a map showing their location. One of these features is the glaciers that were present in the White Mountains during the Ice Age, I briefly discussed this in Arizona Rocks 75, but this has more information and where to go see the evidence of the glaciers.

The Springerville Volcanic Field is mainly basalt flows and cinder cones, over 400 eruptions. It covers 1,158 square miles. The volcanic activity started about 3 million years ago and ended 300,000 years ago. The older White Mountain Volcanic Field is south of the Springerville Field and was active from 9 to 2 million years ago. Mount Baldy is the prominent feature of the White Mountains. It is a stratovolcano, 11,400 feet high and the second highest peak in Arizona. (Note: I have found lots of different elevations for Mount Baldy, 11,400, 11,403, 11,409, and 11,421 feet, when I visited Mount Baldy in the 1970s the sign there said 11,590 feet. Today, Mount Baldy is closed to the public as it is sacred Apache land, but there are high points not on the reservation next to the peak that you can visit.)

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The 26 features in Arizona Geological Survey Down-to-Earth 16

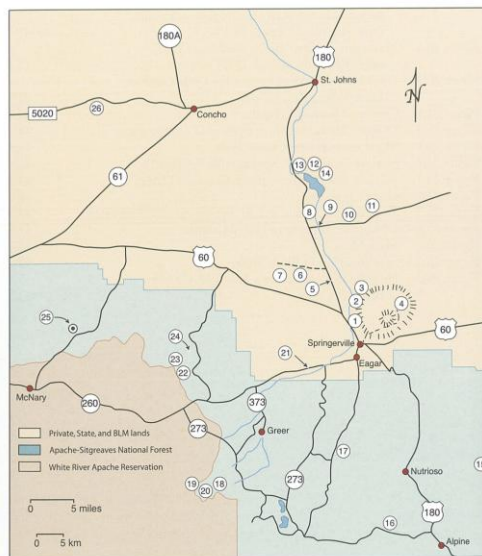
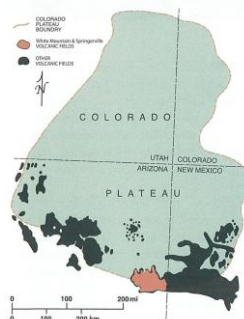


Figure A. Index map and location of geologic features and access roads in the White Mountain-Springerville area.

Map showing the location of the features in Arizona Geological Survey Down-to-Earth 16



Map showing the Springerville and White Mountain Volcanic Field location from Arizona Geological Survey Down-to-Earth 16



AZ Mining, Mineral & Natural Resources Education Museum Update July 2021

<https://ammnre.arizona.edu/>

Catie Carter Sandoval

cscarter@email.arizona.edu

703.577.6449

Help support the museum at:

<http://tinyurl.com/SupportMM-NREMuseum>

I have some good news to report. In August, we'll be moving the "Banquet of Rocks"



display out of the AZ Historical Society's building in Tempe and putting them on loan to the Cave Creek Museum – thank you to Charlie for setting it up.

The AZ Geological Survey is making plans to move the many file cabinets stored in the main gallery. Update on those to come soon.



On Friday, July 30th, Bill Yedowitz, Don Richardson and his brother David, Charlie Connell, Doug Duffy, Shirley Coté and Catie Sandoval (photographer), gathered to load up the three lapidary slab saws.



Two of the saws were loaded into David's rented trailer and he proceeded to head back to Tucson where he plans to try to refurbish them.



The smallest of the slab saws was loaded into Don Richardson's pick-up. Don will try to refurbish it.



Pinal Geology & Mineral Museum

Pinal Museum and Club News

351 N. Arizona Blvd., Coolidge, AZ
Pinal Gem and Mineral Club meeting

September 2021

www.pinalgeologymuseum.org

Ray Grant raycyn@cox.net.

Pinal Geology and Mineral Museum will be closed until further notice due to the health emergency.

We are continuing to work on our exhibits and make new ones in anticipation of a grand reopening event in the fall.

On Monday, July 26, I went to the Imagine Charter School in Coolidge. They had a breakfast for teachers and groups were allowed to set up tables. I handed out information about the Museum and I brought the ESM's Earth Science Education Kits to show and to get the names of teachers who would be interested in having one for their classroom. I will contact those teachers and set a day to meet at the Museum and go over the kits. --- Ray Grant



<https://oceanexplorer.noaa.gov/oceanos/explorations/ex1605/background/geology/welcome.html>

The Geology of the Mariana Convergent Plate Region

By Bill Chadwick - Oregon State University and NOAA/PMEL

Patty Fryer - University of Hawaii



There are so many exciting geological features within the Mariana region, the area is like an amusement park for geologists. The region has earthquakes, volcanoes, hydrothermal vents, cold seeps, and the biggest mud volcanoes on Earth. There are many extremes within this region: it hosts the deepest place on the planet (at the Challenger Deep in the Mariana Trench at 10,916 meters or 35,814 feet deep), extraordinary activity in the volcanic arc including submarine eruptions, venting of liquid carbon dioxide, ponds of molten sulfur, and hydrothermal vents that are teeming with exotic species. Between the Mariana Trench and the island volcanoes, huge mud volcanoes provide a window into the boundary between two tectonic plates that have been colliding for over 50 million years and harbor unique communities of organisms that thrive in the most extreme fluid composition recorded in the oceans. For all these reasons, the area has been designated as a National Monument, the Mariana Trench Marine National Monument.

Why is there so much geological activity in this corner of the world? It's because tectonic plates are colliding in some areas and spreading apart in others, producing a wide variety of environments that make the Mariana region such a fascinating place to explore.

The Mariana Trench

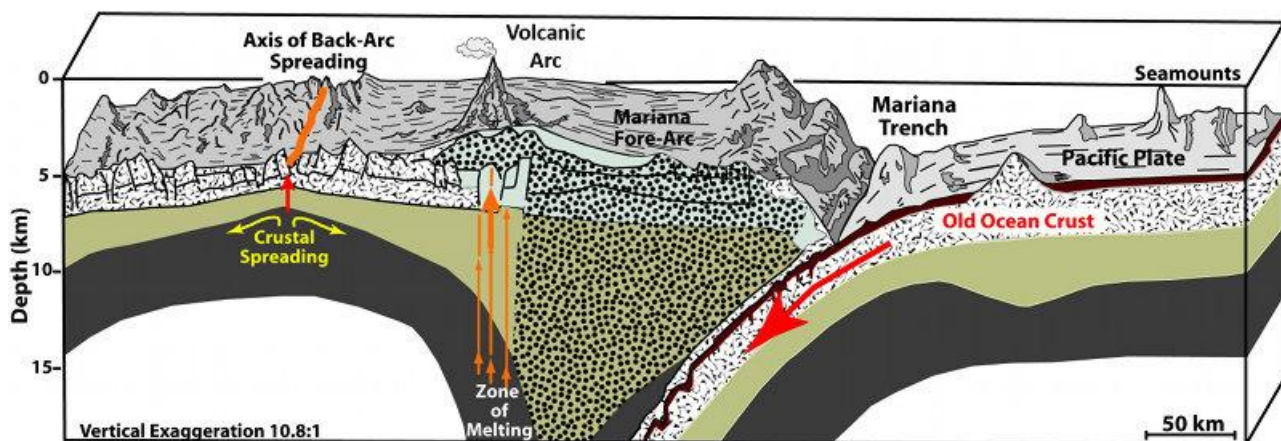


Figure 1: Cross-section of the Mariana subduction zone, showing the relationship between the Trench, Forearc, Volcanic Arc, and Back-Arc. *Image adapted from Hussong and Fryer, 1981.*

Where tectonic plates collide they form trenches, which are the deepest places in the world's ocean. At a trench, one tectonic plate (the "downgoing plate") plunges beneath another (the "overriding plate") at what is called a "subduction zone." The downgoing plate bends and angles downward into the Earth's mantle, and the boundary between the two plates develops into a trench (Figure 1).

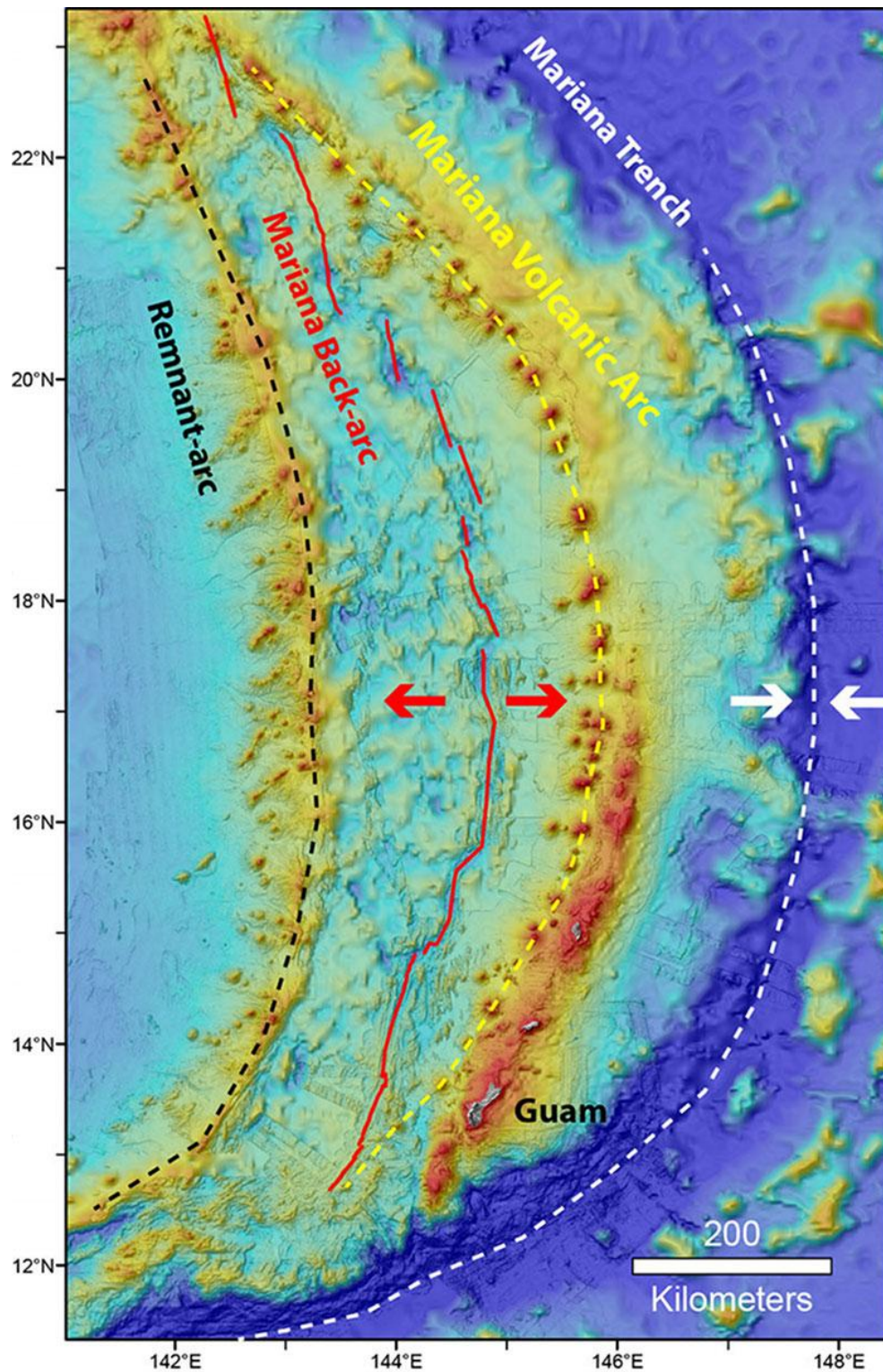


Figure 2: Map showing the locations of the Mariana Trench (white dashed line), Volcanic Arc (yellow dashed line), and back-arc spreading center (red line) and remnant arc (black dashed line). *Image courtesy of Bill Chadwick*

At the Mariana Trench, the downgoing plate is called the Pacific Plate, and the overriding plate is the Philippine Sea Plate. The depth of the Mariana trench varies along its length. Where large, old seamounts are present on the Pacific Plate at the subduction zone, the trench is shallower. Such collisions involving subducting seamounts also cause the edge of the overriding Philippine Sea Plate to uplift.

In the Mariana system, the trench is curved in map view (see the white dashed line on Figure 2). The actual forces that control the shape of the trench are related to broad regional plate movement. Over its history, as the Pacific Plate has been subducted, it has been “rolling back” toward the east. That means the trench has migrated eastward with time. The Mariana Trench, however, is “pinned” on both its north and south ends by the jamming up of subduction through collision with the Ogasawara Plateau in the north and the Caroline Ridge in the south. This is why the Mariana system and its youngest back-arc ocean basin is “banana shaped,” concave to the west.

The Forearc

The forearc is the “museum” of the Marianas. This region, between the trench and the volcanic arc (Figure 3), preserves the earliest evidence of subduction and the entire history of the three episodes in which the island arc system was torn apart, with the trench and volcanic arc moving eastward and leaving new back-arc ocean basins in its wake, as the Pacific Plate has rolled back. All this tectonic activity left the forearc heavily deformed, thus faults crisscross most of it.

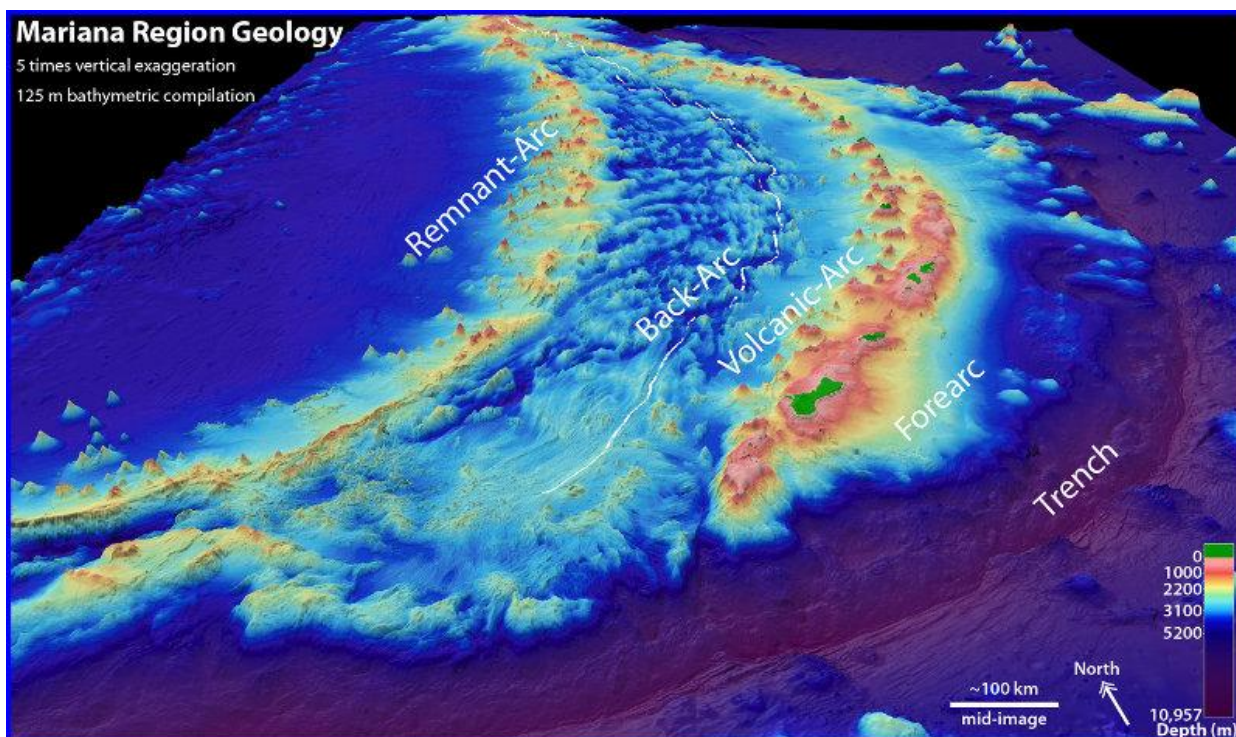


Figure 3: Oblique 3D-view of the Mariana region with the seafloor colored according to depth (purple = deepest; red = shallowest; green = islands). Labels show locations of Trench, Forearc, Volcanic Arc, and Back-arc. *Image courtesy of Susan Merle.*

The active subduction process continues to affect and update the museum. A downgoing tectonic plate can remain stuck under a forearc region for months or years or decades, as the subduction zone between them builds up collision energy. When the stress gets too big, the plates slip along the contact fault between them and an earthquake occurs. Such earthquakes (like the Japan earthquake of 2011) can cause devastation and dangerous tsunamis. Big earthquakes cause smaller aftershocks, and the movement on preexisting forearc faults pulverizes rock along the fault contacts. Some of these faults apparently cut right through the entire forearc crust and mantle, reaching depths of up to 18 kilometers (nearly 11 miles).

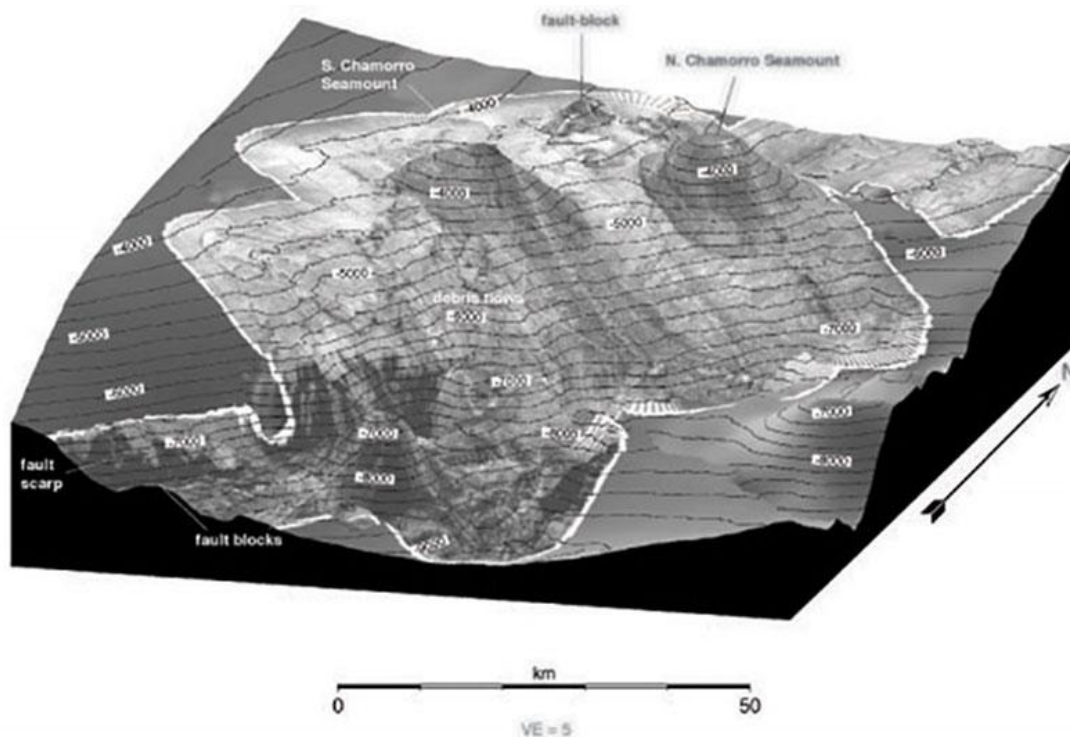


Figure 4: Oblique view of survey of two serpentine mud volcanoes on the southern Mariana forearc. View is from the southeast of sonar backscatter (dark = rough seafloor, light = smooth sedimented seafloor) superimposed on bathymetry data. Contour interval is 500 meters, annotated every 1,000 meters. Vertical exaggeration = 5 times. Image shows North and South Chamorro Seamounts, debris flows from a sector collapse of South Chamorro Seamount and fault scarps near the trench, which is toward the lower right corner of the image. *Image courtesy of Fryer et al. 1999.*

At such depths, the downgoing Pacific Plate has begun to release fluids as temperatures and pressures increase (essentially a geologic “distillation” process). The fluids rise along the deep faults, reacting with pulverized forearc mantle to “hydrate” the mantle minerals (olivine and pyroxene) and form the mineral serpentine. The resulting serpentinite/fluid mud is less dense than the surrounding rock, so it rises to the seafloor in the forearc, erupting to form mud volcanoes as big as 50 kilometers (30 miles) in diameter and 2,000 meters (6,562 feet) high (Figure 4).

Pieces of the downgoing Pacific Plate are also brought up in the muds. These come from the contact zone between the plates, so studying these materials can tell us about the conditions where the earthquakes happen. Fluid seeps at these mud volcanoes form ghostly chimney structures. These seeps have extreme chemical compositions, yet they support unique seafloor and sub-seafloor biological communities (Figure 5).

Closer to the active volcanic arc are the larger Mariana Islands of Guam, Rota, Tinian, and Saipan. They are all uplifted portions of the Mariana forearc, mostly marine reefs, sediments, and old volcanic deposits that have bobbed up as the surrounding seafloor has slipped away from them along faults unloading the edges of the islands with the weight of that material. Geologists call this “footwall uplift.”



Figure 5: Seafloor photo of the summit area of South Chamorro Seamount showing the Shilling manipulator arm of the JAMSTEC Shinkai 6500 submersible reaching to sample mussels at a seep site. Also in the frame are gastropods, tubeworms, and a crab. *Image courtesy of JAMSTEC Shinkai 6500 submersible.*

The Volcanic Arc

As the downgoing plate plunges even deeper into the Earth’s mantle; fluids that continue to be released cause melting in the surrounding hot mantle at depths from 70 to 100 kilometers (42 to 60 miles). This generates magma (molten rock) that rises up toward the surface and feeds a chain of volcanoes about 200 kilometers (124 miles) west of and parallel to the trench (see yellow dashed line on Figure 2). This chain is called a volcanic arc.

The active volcanoes of the Mariana Arc are mostly seamounts (underwater volcanoes), with summits that are only a few hundred meters (< 1,000 feet) below the ocean’s surface, and only nine are tall enough to form islands. Many are spaced out along a chain with the largest volcano situated farthest east. These make up what is called the volcanic “front.”

Most of the frontal volcanoes also have a chain of additional volcanoes that lie on a line to the west. What is interesting about these “cross-chain” volcanoes is that all of them can be active at the same time. Apparently, arc magma can leak into the back-arc region from the arc magma source.

Hydrothermal vents at the summits of the arc volcanoes have a wide variety of ecosystems and a complex and extremely variable (both in space and time) structure and chemical composition.

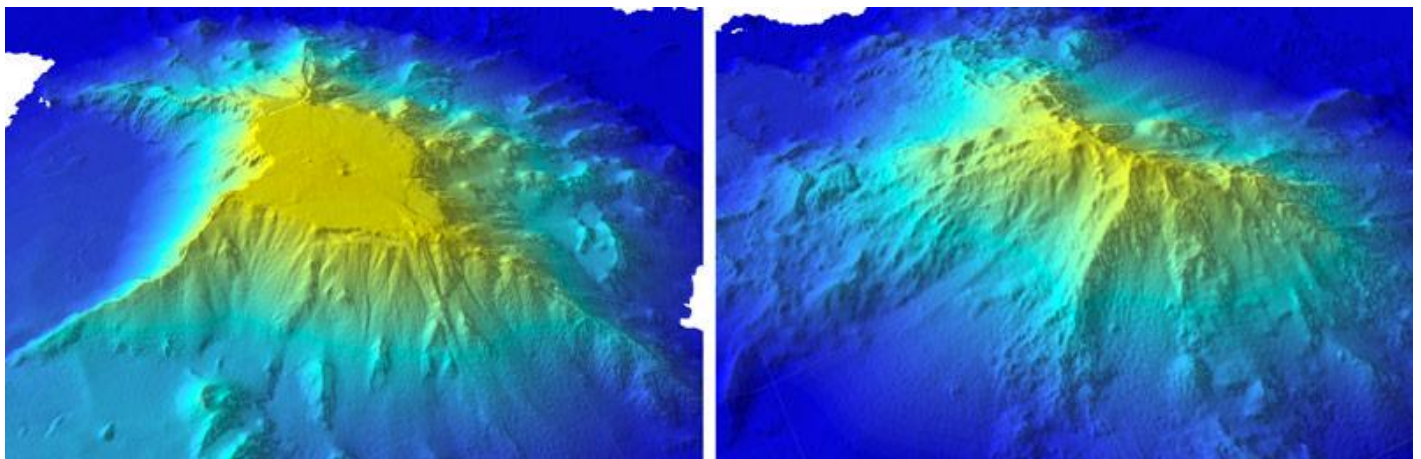
The Back-arc

In some subduction zones like the Mariana system, where strong rollback forces are at work, the overriding plate is under tension. The volcanic arc is the weakest point because it is both warmer and more “brittle,” so that is where the arc typically starts to break up. Each time the Mariana Volcanic Arc has broken up, the crust and upper mantle faulted, stretched thinner, and began to subside. At this point, an ocean basin started to form between the still-active volcanic front on the east and what eventually became an inactive remnant arc on the west (see black dashed line on Figure 2).

During this first stage of break-up, scattered volcanism can occur on the newly-forming ocean basin floor, but after a few million years, the volcanism becomes more organized into a series of seafloor spreading center segments (see red lines on Figure 2).

Volcanism on these segments creates new ocean crust with a different composition from the volcanic arc. Because of the concentrated volcanic activity along the back-arc spreading segments, hydrothermal vents tend to focus along them. Unlike the shallow hydrothermal systems on the arc and cross-chain volcanoes, the vent sites on the back-arc spreading center segments are deeper (3,000-5,000 meters or 10,000-16,000 feet) and have different geologic and chemical environments and very different vent ecosystems.

Guyots and Seamounts



Flat-top guyot (left) shown in comparison to a conical seamount (right). *Image courtesy of the Schmidt Ocean Institute.*

The top or summit of a guyot is where it differs significantly from a conical seamount. On a conical seamount, the volcanic rock emerging from the bottom simply continues until it forms a peak or until it falls away into a summit crater created when the underlying magma chamber collapsed. In contrast, guyot summits have a cap of carbonate rock laid down by shallow-water coral and bivalve reefs when the seamount was at the surface many millions of years ago.



Parent/Teacher Resource Page 1

<https://www.earthsciweek.org/>

EARTH SCIENCE WEEK UPDATE - JULY

Minerals Day Returns on Monday, October 11

Last year AGI and the Mineralogical Society of America (MSA) kicked off the first annual Minerals Day – and this celebration of minerals is returning on Monday, October 11, during Earth Science Week 2021. Minerals Day raises awareness of and appreciation for minerals among the general public as well as students and teachers of all ages and at all levels.

AGI and MSA have developed materials and collaborated with geoscience partners in government agencies, professional associations, private corporations, and other groups – such as museums, libraries, and rock and mineral clubs, to name just a few – to make an impact with Minerals Day.

At a time when families and educators alike are seeking new ways of providing young people with the education tools they need to succeed, AGI and MSA are proud to join forces through Minerals Day in rallying the minerals, mining, and mineralogical studies communities to help meet this challenge. Look for relevant information and resources on [AGI's Minerals Day page](#) and [MSA's Minerals Day page](#).

View 'Why Earth Science' Online with Your Students

AGI's amazing "Why Earth Science" video is now available for free viewing online on YouTube and TeacherTube. For an exciting introduction to the geosciences, you can't do better than this six-minute clip, featuring eye-popping cinematography and computer-animation highlights from AGI's "Faces of Earth" mini-series on The Science Channel.

The video, which won a Silver Telly Award, is ideal for illustrating the importance of Earth science to students, parents, and community members who want to learn about the subject's place in your curriculum. View the clip on [YouTube](#) or [TeacherTube](#).

From Streams to Oceans, Study Water with ASLO

The Association for the Sciences of Limnology and Oceanography (ASLO), an AGI member society, offers an extensive collection of free access, peer-reviewed, and up-to-date content that can be useful in teaching about limnology or oceanography – the studies of inland freshwater systems and oceans, respectively.

ASLO offers e-Lectures written and reviewed by expert scientists, online virtual items that pull articles from various ASLO journals under a common theme, and tools and resources for science communication and policy. Materials are designed to be used from upper-level high school to graduate courses in various aquatic science topics.

"Water Today and for the Future." Learn more at [ASLO Teaching Resources](#)

Parent/Teacher Resource Page 2

Take a virtual-tour of the Smithsonian National Museum of Natural History!

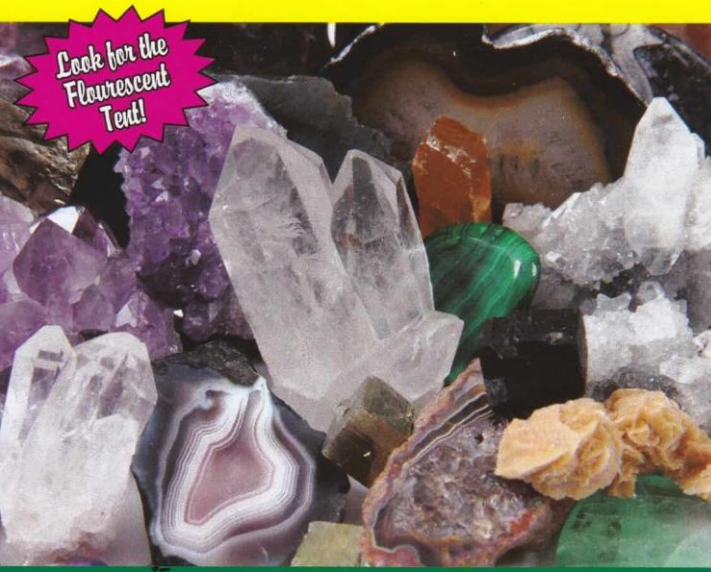
David H. Koch Hall of Fossils – Deep Time

- [Main Entrance](#)
- [The Not-So-Distant Past](#)
- [Costs and Benefits of Living Large](#)
- [Life in the Neogene Ocean](#)
- [End Cretaceous Mass Extinction Event and View of Early Horse and Green River Fossils](#)
- [Dinosaur Diversity Peaks / Cretaceous Seas 2](#)
- [Bird Origins / Cretaceous Seas 1](#)
- [Stegosaurus Spikes vs. Ceratosaurus Claws](#)
- [Reptiles Move Back to the Ocean in the Jurassic](#)
- [Dinosaur Evolution and Trees of the Triassic](#)
- [A Riot of Evolution after a Mass Extinction](#)
- [Permian Extinction 1](#)
- [Jurassic Dinosaurs, Plants, and Insects](#)
- [Main Circulation Path and Age of Humans Bridge](#)
- [T. rex and the Last American Dinosaurs: 1](#)
- [T. rex and the Last American Dinosaurs: 2](#)
- [Asteroid Impact Triggers Dinosaur Mass Extinction](#)



Tyrannosaurus rex attacking a *Triceratops*

PRESCOTT
GEM & MINERAL SHOW
17th Annual
SHOW & SALE
ROCKS • GEMS • JEWELRY



FIRST WEEKEND
IN AUGUST

FINDLAY TOYOTA EVENT CENTER

3201 N Main St - Prescott Valley
 (Corner of Glassford Hill & Florentine)

FRI & SAT 9-5, SUN 9-4
 Admission - Cash Only - ATM Available

FREE PARKING!

\$5 Adults

\$4 Seniors 65+, Vets, Students
 Children under 12 FREE w/paid Adult

www.PrescottGemMineral.org

GILBERT FINE MINERAL SALE 13th ANNUAL

AUGUST 21, 2021

GILBERT HISTORICAL MUSEUM: 10 S. GILBERT RD., GILBERT, AZ 85296
 10:00 AM - 4:00 PM

GRAEMITE psd. Tainite with Cuprite, 3.7cm, Shattuck Mine, Bisbee, Mule Mts., Cochise County, Arizona, USA. Arizona-Sonora Desert Museum Collection. © Jeff Scovil. Photo: Chris Whitney-Smith

13th Annual Gilbert Fine Mineral Sale 2021

This intimate venue is an opportunity for collectors to see Arizona dealers' newest acquisitions before Denver Gem & Mineral Show® in September.

WHEN:
 Saturday, August 21, 2021
 10:00AM - 4:00PM
 3:00PM: Signing Event M.R. Arizona-II & Arizona VII

WHERE:
 Gilbert Historical Society Museum
 10 S. Gilbert Rd
 Gilbert, AZ 85296
 (Southwest corner of Gilbert and Elliott Roads)

PARKING:
 Parking is available at Gilbert Elementary School
 West parking lot off (Gilbert and Elliott Roads) intersection.
 Take 2nd driveway on Elliott Road, **NOT** the 1st driveway.

COST:
 Free Admission

SALE DETAILS:
 Individually wrapped snacks, sodas, and water provided for those attending. For anyone who would like more variety, there are several restaurants just 3 blocks North on Gilbert Road in Old Town Gilbert including Barrio Queen, Liberty Market, Postinos, Oregano's, Joe's Real BBQ, Zinburger & others.

FEATURED MINERAL DEALERS

✧ De Natura ➤ Debut 1000+ new Thumbnail Minerals not offered for sale before!	Les & Paula Presmyk
✧ Canyon Colors	Mark Candee
✧ CWS Fine Minerals	Chris Whitney-Smith
✧ Headframe Minerals	Don Boushelle
✧ Blue Sky Minerals	Mike Hollonbeck
✧ Shannon Family Minerals ➤ Debut several new collections & freshly dug AZ wulfenite/fluorite!	Michael Shannon

SEE YOU THERE!
 Les & Paula, Mark, Chris, Don, Mike H., and Mike S.

We ask anyone who has not been vaccinated or had COVID-19 to follow proper masking protocols.



**Payson Rimstones
23rd Annual Gem
and Mineral Show**

**September 17th
through 19th, 2021**

**Event Center
Mazatzal Hotel & Casino**
Admission \$3 , Under 13 free
**Hours: Friday 2-7 p.m.,
Saturday 9-5, Sunday 10-4**

The Payson Rimstones Rock Club is a 501c3 Charitable
Organization



2022 FGMS SHOW INFORMATION

PHOENIX AREA'S LARGEST GEM AND MINERAL SHOW
49th FLAGG GEM AND MINERAL SHOW

(JEWELRY, GEMS, BEADS, FOSSILS, MINERALS, AND LAPIDARY SUPPLIES)

FREE PARKING
FREE ADMISSION

FRIDAY, SATURDAY, SUNDAY JANUARY 7, 8, and 9, 2022
9AM TO 5PM EACH DAY

AT MESA COMMUNITY COLLEGE

THE WEST PARKING LOT ON DOBSON ROAD JUST NORTH OF THE SUPERSTITION FREEWAY
(ROUTE 60), MESA, ARIZONA

**ALL ARIZONA CLUB MEETINGS MAY BE CANCELED
DUE TO HEALTH CONCERNS!**



Apache Junction Rock & Gem Club
Meetings are on the 2nd Thursday
Next Meeting: September 9, 2021, 6:30 pm
www.ajrockclub.com
@ Club Lapidary Shop
2151 W. Superstition Blvd., Apache Jct.



Daisy Mountain Rock & Mineral Club
Meetings are on the 1st Tuesday
(unless a Holiday then 2nd Tuesday)
Next Meeting: September 7, 2021, 6:30 p.m.
www.dmrmc.com
@ Anthem Civic Building
3701 W. Anthem Way, Anthem, AZ



Maricopa Lapidary Society, Inc
Meetings are on the 1st Monday
(unless a Holiday then 2nd Monday)
Next Meeting: September 13, 2021, 7:00 pm
www.maricopalapidarysociety.com
@ North Mountain Visitor Center
12950 N. 7th St., Phoenix



Mineralogical Society of Arizona
Meetings are on the 2nd Thursday
(September meeting on the 3rd Thursday)
Next Meeting: September 15, 2021, 7:30 pm
www.msaaaz.org
Franciscan Renewal Center
5802 E. Lincoln Dr., Scottsdale



Pinal Gem & Mineral Society
Meetings are on the 3rd Wednesday
Next Meeting: September 15, 2021, 7:00 pm
www.pinalgemandmineralsociety.org
@ Artisan Village
351 N. Arizona Blvd., Coolidge



West Valley Rock & Mineral Club
Meetings are on the 2nd Tuesday
Next Meeting: August 12, 2021, 6:30 pm
www.westvalleyrockandmineralclub.com
@ Buckeye Women's Club
845 E. Monroe Ave., Buckeye, AZ



White Mountain Gem & Mineral Club
Meetings are on the 1st Sunday
(unless a Holiday then 2nd Sunday)
Next Meeting: TBA 2021, 1:00 pm
www.whitemountain-azrockclub.org
@ VFW Hall
381 N. Central, Show Low



Wickenburg Gem & Mineral Society
Meetings are on the 2nd Friday
(February & December on the 1st Friday)
Next Meeting: October 9, 2021, 7:00 pm
www.wickenburggms.org
@ Coffinger Park Banquet Room
175 E. Swilling St., Wickenburg

ESM's Meeting Notice

ESM's next meeting will be at North Mountain Visitor Center, 12950 N. 7th St., Phoenix, on Tuesday, TBA 2021, at 6:30 p.m.

BECOME A MEMBER!
Join the Earth Science Museum's



IS IT TIME TO RENEW YOUR MEMBERSHIP?
Please renew today! 😊😊😊

----- cut here -----
**ESM Earth Science Investigation
 Team Membership Form**
 _____ **New Member** _____ **Renewal**

Membership levels:

_____ **ESI Family \$20**

_____ **ESI Individual \$10**

Membership benefits:

- ◆ Monthly e-newsletter *Earthquake*
- ◆ Official team membership card
- ◆ Knowledge that your contribution is making a difference in earth science education.

MANY THANKS TO OUR MAJOR DONORS!

- AZ Leaverite Rock & Gem Society
- Flagg Mineral Foundation
www.flaggmineralfoundation.org
- Friends of the AZ Mining & Mineral Museum
- Maricopa Lapidary Society
<http://maricopalapidarysociety.com/>
- Mineralogical Society of AZ
www.msaaaz.org
- Payson Rimstones Rock Club
- Sossaman Middle School
- White Mountain Gem & Mineral Club
www.whitemountain-azrockclub.org
- Wickenburg Gem & Mineral Society
<http://www.wickenburggms.org>
www.facebook.com/pages/Wickenburg-Gem-and-Mineral-Society/111216602326438
- Staples Foundation
www.staplesfoundation.org
- Anita Aiston
- Peter & Judy Ambelang
- Stan & Susan Celestian
- Russ Hart
- Will & Carol McDonald
- Debbie Michalowski
- Janet Stoepplmann
- Dennis & Georgia Zeutenhorst

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Phone:
 602-973-4291

Editor E-Mail:
 scote@earthsciencemuseum.org

Mission
 Our Mission is to excite and inspire all generations about earth sciences through educational outreach.

Vision
 We envision a community where students and the general public have curiosity about, passion for, and understanding of the underlying principles of earth sciences.

For more information about the ESM, how to become a member or how to arrange for a school visit or Community function, go to:
www.earthsciencemuseum.org.

We're on the Web!

Visit us at:

www.earthsciencemuseum.org

NOTICE:
 ESM's next meeting will be at North Mountain Visitor Center, 12950 N 7th St, Phoenix, on Tuesday, TBA 2021, at 6:30 p.m.

THANK YOU FOR YOUR CONTINUING INTEREST & SUPPORT!!!

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