



# 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](http://www.earthsciencemuseum.org), [scote@earthsciencemuseum.org](mailto:scote@earthsciencemuseum.org), 602-973-4291

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## ESM Upcoming Special Events

By Shirley Coté, Ray Grant and Harvey Jong

The ESM will be one of the non-profit exhibitors at the Arizona Science Teacher Association's Annual Conference that will be held at Grand Canyon University on Oct. 11-12, 2013. At this event, science educators from across Arizona will be getting together to share ideas about best practices in science teaching and learning. The ESM booth will create awareness about our Outreach Program; how schools can receive free resource kits on rocks, minerals, and fossils; and our efforts in building a new museum. In addition, we will be gathering inputs from teachers on what they need in implementing new curriculum standards, such as Common Core, and the Next Generation Science Standards. This information will be essential in refining our current outreach materials, developing new kits, and planning museum exhibits.



### Join the ESM & MCC for **EARTH SCIENCE DAY**

**Saturday, October 19, 2013 from 10-4**  
**F R E E ADMISSION & PARKING**

The Earth Science Museum, in association with Mesa Community College (MCC) Physical Science Department is organizing **EARTH SCIENCE DAY**, a one day event on Saturday, October 19<sup>th</sup> at the Physical Science Building on the MCC campus. This event represents a local culmination of the American Geosciences Institute's *Earth Science Week*, October 13-19, 2013, and you are invited to take part in this family-oriented celebration of the earth sciences.

**EARTH SCIENCE DAY** will be held from 10 a.m.-4 p.m., and we will feature a variety of fun activities that will help children and adults gain a better understanding and appreciation for the earth sciences. These activities will include planetarium shows scheduled in the morning and afternoon, presentations on minerals and geology, and a hands-on geology mapping exercise.

We are also promoting interest in the lapidary and mineral collecting hobbies by having local organizations host popular activities, such as Egg Carton Collections, Fossil Dig, and Spinning Wheels.



ASU's School of Earth and Space Exploration  
presents

### **EARTH AND SPACE EXPLORATION DAY**

Saturday, November 2, 2013 from 9-3  
**F R E E ADMISSION & PARKING**

Join the Earth Science Museum in celebrating Earth and Space Exploration Day at ASU's Tempe campus inside/outside ISTB4 building off Rural Rd. on Terrance Rd. south of University.

You will enjoy science-related activities, interactive exhibits, 3-D astronomy shows, see a replica of the "Curiosity" rover, pan for gold, dig for meteorites and much more.

For more information and to register go to <http://sese.asu.edu/earth-and-space-exploration-day>



ESED/2012

S. Coté photo



**SATURDAY, OCTOBER, 19, 2013**

**EARTH SCIENCE DAY**

**At Mesa Community College, Physical Science Building**

**Free Admission and Free Parking**

**The planetarium, lectures, demonstrations and  
geologic mapping activities are FREE**

**Schedule of Events 10 AM to 4 PM**

10:00 – Earth Science Day opens

**10:15 – Planetarium Show** – seating is limited and free tickets should be picked up at the information table.

11:00 – Lecture and Demonstration on the Geologic mapping of Europa, a moon of Jupiter.

11:30 – How Geologic Maps are made, a demonstration and exercise to make your own map, location at Purgatory Flat behind the Physical Science Building.

**12:30 – Planetarium Show** – seating is limited and free tickets should be picked up at the information table.

1:00 – Lecture and Demonstration related to some aspect of Geologic mapping.

1:30 – How Geologic Maps are made, a demonstration and exercise to make your own map, location at Purgatory Flat behind the Physical Science Building.

**2:30 – Planetarium Show** – seating is limited and free tickets should be picked up at the information table.

### **OTHER FUN ACTIVITIES**

From 10 to 4

Various organizations from around the Phoenix area will have other activities such as Egg Carton Collections (12 samples in an egg carton for \$1.00) and spinning wheels that have a small charge.

There will be a free dig for fossils activity and free mineral samples for kids and teachers.



## Arizona Rocks 3

Text and photos by Ray Grant

Another common rock in Arizona is granite. Granite is an intrusive igneous rock, which means the magma cooled slowly underground rather than erupting out on the surface. The slow cooling allows larger crystals to grow, so for rocks like granite we can see the individual minerals. The common minerals in granite are quartz and microcline (potassium feldspar) with some plagioclase and sometimes biotite or muscovite. Granite is often used as a general term for other light colored coarse-grained igneous rocks including granodiorite, quartz monzonite, and monzonite that have a slightly different mineralogy or chemistry.

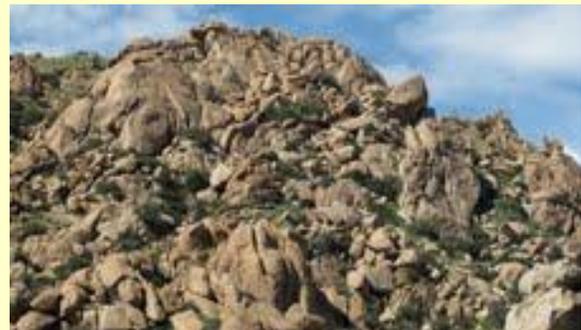
At many locations in Arizona, granite shows spheroidal weathering, such as along the Beeline Highway and at Texas Canyon near Wilcox. The large rounded boulders make a spectacular landscape. These rounded boulders form under the ground, perhaps when the climate was wetter, and erosion during the drier times exposes them.

There are five major times when granite intrusions occurred in Arizona. They are: Early Proterozoic (1.6 to 1.8 billion years ago), Middle Proterozoic (around 1.45 billion years ago), Jurassic (150 to 180 million years ago), Early Tertiary to Late Cretaceous (50 to 82 million years ago), and mid-Tertiary (20 to 25 million years ago). In the Phoenix area mid-Tertiary granite makes up the eastern half of South Mountain; Early Proterozoic granites are found at Utery Mountain Park and on the Beeline highway; and Middle Proterozoic granite is present at Pinnacle Peak, the Carefree area, the back of Camelback Mountain and in Papago Park near Hole-in-the-Rock. The Jurassic granites

are present in the southern part of Arizona for example at Kitt Peak. The mid-Tertiary granites are associated with Arizona's copper deposits. You can go to the Arizona Geological Survey website [www.azgs.az.gov](http://www.azgs.az.gov)) go down to geologic map of Arizona and you can find the locations of the different granites and other rocks.



Granite from the Walker Butte Granite Quarry near Florence, gray is quartz, pink is microcline, white is plagioclase, and black is biotite.



Spheroidal weathering of granite at Texas Canyon near Wilcox



Spheroidal weathering of granite at Texas Canyon near Wilcox

# EXPLORE YOUR WORLD!

## A Wonderland of Rocks!

From Chiricahua NM/NPS.org, Wikitravel.org, and geologist Ray Grant

A “Wonderland of Rocks” is waiting for you to explore at Chiricahua National Monument. The 8-mile paved scenic drive and 17-miles of day-use hiking trails provide opportunities to discover the beauty, natural sounds, and inhabitants of this 11,985 acre site. The park entrance is at an elevation of about 5000 feet. The trailheads for the main formations in Echo Canyon and vicinity are at about 7000 feet.

Located in the far southeastern corner of Arizona in the Coronado National Forest, are the beautiful Chiricahua Mountains, one of several “sky island” mountain ranges surrounded by expansive desert grasslands. The Chiricahua Mountain Range is an inactive volcanic range twenty miles wide and forty miles long that rises up from the valley floor to over nine thousand feet, cresting in a series of uneven, volcanic looking peaks.

At the northern end of the range is an extraordinary area of striking geological features and enormous biodiversity. Tucked deep into these steep, forested valleys and beneath the craggy peaks are the remains of violent geological activity that continued for many millions of years -- the pinnacles, columns, spires and balanced rock of Chiricahua National Monument.

The Chiricahua Mountains are an ash flow volcanic field with activity from 32 to 22 million years ago. The largest eruptions were high silica rhyolite ash flow tuff with a thickness up to 430 meters (around 1,411 feet).



Photo Wikipedia  
Eroded rhyolite tuff, Chiricahua National Monument



Photo Wikipedia  
Eroded rhyolite tuff, Chiricahua National Monument



Photo Wikipedia  
Spires of eroded rhyolite tuff also called Hoodoos, Chiricahua National Monument

## **ESM's Upcoming Meeting**

The Earth Science Museum's next scheduled meeting is September 11<sup>th</sup> at the Burton Barr Library, located near Central Ave. and McDowel in Phoenix at 6:30 p.m. in Rm. B. Everyone is welcome to attend.



**CELEBRATE EARTH SCIENCE WEEK in  
your community!  
October 13 - 19, 2013**



**“Mapping Our World”**



With special thanks to Mardy, Harvey, Doug and Shirley, the ESM upgraded its storage space recently allowing room for new acquisitions.



### **ESM'S “WISH” LIST**

The ESM is still in need of specimens of corundum for its hardness kits; also needed are small fossils and pumice. If you can help, please contact Harvey at [harvey@digipan.com](mailto:harvey@digipan.com).

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## **MANY THANKS TO OUR MAJOR DONORS!**

AZ Leaverite Rock & Gem Society  
[www.azleaverite.org](http://www.azleaverite.org)

Flagg Mineral Foundation  
[www.flaggmineralfoundation.org](http://www.flaggmineralfoundation.org)

Friends of the AZ Mining & Mineral Museum

Maricopa Lapidary Society

Mineralogical Society of AZ  
[www.mineralogicalsocietyarizona.org](http://www.mineralogicalsocietyarizona.org)

White Mountain Gem & Mineral Club  
[www.whitemountain-azrockclub.org](http://www.whitemountain-azrockclub.org)

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Staples Foundation  
[www.staplesfoundation.org](http://www.staplesfoundation.org)

Stan & Susan Celestian  
Russ Hart  
Debbie Michalowski  
Dennis & Georgia Zeutenhorst

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## **STOLEN DANBURITE SPECIMEN**



A 45 pound well crystallized danburite from the San Bartolo Mine, Charcas, San Luis Potosi, Mexico with the dimensions of 30.3 x 31.4 x 23.2 cm high (11.9 x 12.3 x 9.1 in. high) has been stolen.

Please contact Patrick Haynes at (505) 366-3585 if you have any information on the whereabouts of this specimen.

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**Editor E-Mail:**  
scote@earthsciencemuseum.org

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*We're on the Web!*

Visit us on  and at:  
[www.earthsciencemuseum.org](http://www.earthsciencemuseum.org)

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**Mission**

Establish an innovative, world-class destination museum in the Phoenix area dedicated to inspiring all generations about earth sciences.

**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](http://www.earthsciencemuseum.org).

Please join us at the next ESM board meeting  
Wednesday, September 11, 2013, at the  
Burton Barr Library in Phoenix at 6:30 p.m.  
Rm. B.

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