



# THE GEOLOGICAL NEWSLETTER

"NEWS OF THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY"

VOLUME 75, NUMBER 7  
JULY 2009

## The Geological Society of the Oregon Country

P.O. Box 907, Portland, OR 97207

[www.gsoc.org](http://www.gsoc.org)

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VISITORS WELCOME AT ALL MEETINGS

## CALENDAR

### JULY ACTIVITIES

No Friday night meeting is planned for July. Next meeting is tentatively set for September.

No Wednesday evening seminar is planned for July.

### GSOC Field Trip , Saturday, July 11, 2009:

**“Geology of Silver Falls.”** Join GSOC Past President Clay Kelleher for a field trip to Silver Falls State Park, southwest of the town of Silverton and east of Salem. Registration will be at Silver Falls State Park. Cost of the trip is \$10 per adult member or their guest. Cost is \$10 for an adult member accompanied by a minor. In addition to the GSOC field trip fee, there is a \$3 parking fee for the state park, good all day.

Meet at the South Falls Parking area at 8:30 a.m. Go to the “South Falls, Day Use Area”, and meet at the Lodge. Do NOT go to “Park Office”. This trip

will involve a fair amount of easy to moderate hiking. We will hike the “Trail of Ten Falls”, stopping for lunch along the trail, and concluding at about 3:00 pm. There are no rest rooms along the trail.

Wear appropriate footwear and bring insect repellent and sunscreen. Bring camera, handlens (if you have one), binoculars and your sack lunch. Directions from Portland are to head south on I-5, east on Oregon 22 at Salem for about 5 miles, then east on Oregon 214 about 10 miles to the park. Driving time from Portland (I-205 & Stark Street) is about 1:30.

To participate you must be a member of GSOC or a guest of a member. Minors under 18 must be accompanied by an adult GSOC member designated by their parents or guardians. Registration will include signing a liability waiver for all participants. You may register as a GSOC member at the park.

A 5 ½ page article Geology of Silver Falls State Park was published in the March 1998 Geological

Newsletter. Copies will be included with the field trip guide at the site.

A meeting place map will be posted on the GSOC website. Check the GSOC website ([www.gsoc.org](http://www.gsoc.org)) for updates to this information.

## FUTURE ACTIVITIES

The next Friday night meeting of the society will be announced in the July newsletter. Check the GSOC website ([www.gsoc.org](http://www.gsoc.org)) for updates to the calendar.

**GSOC President's Field Trip, August 1-4, 2009: "Geology and Hydrology of the Oregon High Cascades and Deschutes Basin."** Information and registration form for this trip was in the June 2009 *Geological Newsletter*. Your registration form is due July 17, 2009. See the GSOC website ([www.gsoc.org](http://www.gsoc.org)) for updated information.

Needs and Things to Do if you plan to go:

- Send in **registration form and payment**. The form can be found online in the June 2009 edition of *The Geological Newsletter*. (<http://www.gsoc.org/Archives.html>)
- Bring appropriate clothing and footwear – may be hot, cold, wet, muddy and/or windy
- Bring camping gear unless you have arranged indoor lodging. We've reserved the Ogden Group Campground in Deschutes National Forest for the nights of August 1, 2, 3 and 4.
- Bring water, sunscreen, sunglasses, hat, and mosquito repellent.
- Make carpool arrangements, meal arrangements and lodging arrangements (unless you plan to camp with us). If you are riding with someone, be sure to arrange to pay your share of gas, entrance fees, etc. Carpool arrangements can be facilitated by contacting Carol Hasenberg at [cs727@comcast.net](mailto:cs727@comcast.net) or 503/522-4249 and letting her know if you have room for riders or would like a ride.
- **Join GSOC** if you are not a member and want to participate (paper work will be available first morning of the trip)
- If you are driving, it is highly recommended that you purchase either a **U.S. Forest Service Annual Northwest Forest Pass** (\$30) or a

**National Park Senior Pass** (\$10 lifetime fee for persons 62+ years in age – formerly called Golden Age Passport). These are good for entrance into Newberry National Volcanic Monument and several of the other sites where we will be parking. Otherwise, bring lots of \$5 bills, since you will need them for the daily entrance/parking fees. See <http://www.fs.fed.us/r6/passespermits/nwfp.shtm> for more information.

- We may (or may not) be able to have campfires at Ogden Group Campground during our stay. We will call ahead the previous week to verify this, and post on the GSOC website a few days prior to leaving.

Expanded itinerary:

**Saturday, August 1:** Meet at the Government Camp rest area along U.S. 26 (see <http://www.tripcheck.com/Pages/RAentry.asp>) between 7:30 and 8:00 a.m. for check-in. You will need to report to President Carol Hasenberg for check-in and to fill out a liability waiver form to continue on the trip. You will be given a trip packet when you turn in your liability form. We will be leaving the rest area promptly at 8:30. We will study stratigraphy and land forms from Mt. Hood to the Bend area with guest leader Richard Conrey, PhD, of Washington State University, Pullman, Washington, following the field trip guide "SOTA Field Trip Guide: State of the Cascade Arc: stratocone persistence, mafic lava shields, and pyroclastic volcanism associated with intra-arc rift propagation," by Richard Conrey, Department of Geology, Washington State University, Anita Grunder, Department of Geosciences, Oregon State University, and Mariek Schmidt, Department of Geosciences, Oregon State University. Published as DOGAMI Open File Report O-04-04. We will be eating a picnic lunch somewhere en route (tentatively at Cline Falls west of Redmond), so pack your lunch food.

**Sunday, August 2:** Assemble at the Ogden Group Campground at 8:30. We will need to consolidate carpooling today. We will view hydrological characteristics of the Deschutes River Basin with guest leader Ken Lite,

Jr., Registered Geologist, of Oregon Department of Water Resources, following some of the stops on the field trip guide "Hydrogeology of the Upper Deschutes Basin, Central Oregon: A Young Basin Adjacent to the Cascade Volcanic Arc," by David R. Sherrod, U.S. Geological Survey, Marshall W. Gannett, U.S. Geological Survey, and Kenneth E. Lite, Jr., Oregon Water Resources Department. Published in Moore, G.E., ed., "Field guide to geologic processes in Cascadia," Oregon Department of Geology and Mineral Industries Special Paper 36, p. 109-144. Some moderate hiking will be done in the Crooked River Canyon. We will be eating a picnic lunch at Peter Skene Ogden Wayside (the Crooked River Gorge bridges) so pack your lunch food.

**Monday, August 3:** We will meet at 8:30 a.m. at the DeArmond room of the Deschutes County/State building at 1300 Wall St, Bend, Oregon.

Morning talk will be with guest speaker Todd Cleveland, Deschutes County Planning, presenting "Deschutes Groundwater Pollution: Problems and Solution". After the talk, we will drive north to Culver, Oregon, where we will meet at the EarthH<sub>2</sub>O bottling facility at 7<sup>th</sup> and C Streets. Our tour will be from 11:30 a.m. to 1:00 p.m.

After the tour, we will proceed to Smith Rock State Park (be prepared to pay the \$3 entrance fee) and there we plan to eat a picnic lunch. After lunch, GSOC field trip leaders Bev Vogt and Richard Bartels will begin a tour at Smith Rock of the newly recognized 29.5 million-year-old Crooked River Caldera that was the source of some of the ash of the John Day Formation. Because this caldera is one of the largest known in Oregon, to see it we will cover some spectacular scenery. Time permitting, they will take us to Crooked River Caldera stops of Ochoco Wayside near Prineville, and either Ochoco or Prineville Reservoir.

**Tuesday, August 4:** We will meet at 8:30 a.m. at the Ogden Group Campground.

We will explore Newberry Volcano, the huge-25-mile wide and 40-mile-long shield volcano near Bend with GSOC field trip leaders Bev Vogt and Richard Bartels. During its almost half a million years lifetime, it has had several caldera collapses and has erupted basalt, basaltic andesite, dacite, and

rhyolite, in the form of flows, tuffs, and ash, including the famous Big Obsidian Flow that we will examine, along with Paulina Peak, East Lake, Paulina Lake, the Central Cone, the Pumice Desert—and many other strange and wonderful things and places that are a part of Newberry Volcanic Monument. Bring a sack lunch.

We've reserved the Ogden Group Campground for the night of the 4<sup>th</sup> so you can remain and camp after the close of the field trip.

**GSOC Annual Picnic** will be on August 30 in Mt. Tabor Park in Portland. Details will be forthcoming in the August newsletter and online.

## The Cascadian Graben

Richard Conrey's April 30 Seminar at OSU Geology focused on this topic, which will also be discussed on Day 1 of the GSOC President's Field Trip:

There is a spreading rift zone running down the center of the Western Cascades from near the Three Sisters in Oregon to its apex near Mt. Adams in Washington. The rift propagation model integrates geochemistry, tectonics, and structural evidence for features of Cascade volcanism. The Yellowstone plume may have initiated and fueled the rift, which began 7-8 million years ago near the western terminus of the Brothers Fault Zone.

The effects of rifting, which include diverse magmas, blurred stratocone foci, and hotter crustal temperatures, are more prominent at the older, southern end. South Sister, for example, has a broader dome field, thus is less steep than Mt. Hood, which has a single dome. The lavas from the Sisters are more diverse than the lava from Mt. Hood and Mt. Adams, because the degree of mantle melting declines northward along the rift.

Subsidence is greater in the southern end, where it began about 5.5 million years ago, at about 3 km depth by borehole studies, whereas subsidence is about 1 km between Mt. Hood and Mt. Jefferson. In northern Oregon, the subsidence began about 4 million years ago. Along the rift are complex

graben structures, with tilting of fault blocks about 10° to the east.

Janet Rasmussen

## METEORITES ON THE ROAD

Synopsis of the June 12, 2009, lecture by Dick Pugh, field scientist at Cascadia Meteorite Laboratory

by Evelyn Pratt with edits by Melinda Hutson

Portland State University is proud of having the only meteorite lab in the Pacific Northwest. The Cascadia Meteorite Laboratory was established in 2003 as part of the Department of Geology. In 2005 it became an official repository for type specimens of newly-classified meteorites. The laboratory is run by Melinda Hutson, Alec Ruzicka, and Dick Pugh. It now has slightly under 500 meteorites.

What is the difference between an asteroid, a meteoroid, a meteor, and a meteorite? If it is in space and you can see it with a telescope, it's called an asteroid; if it is in space and you cannot see it with a telescope, it's called a meteoroid. A meteoroid may be traveling at 25,000 mph when it hits the atmosphere 90 miles high. Once a meteoroid enters the Earth's atmosphere, its exterior becomes hot enough to glow and it is called a meteor or a fireball. By 50 miles above Earth, most meteors break up into pieces. A desk-size meteoroid entering the atmosphere has the power of 50 tons of TNT. If a piece of the meteor hits the ground and can be picked up, then it's called a meteorite.

Mr. Pugh showed many examples of meteorites. On February 19, 2008, Providence Hospital photos showed a fireball 250 miles away that traveled from the Canadian Border to La Grande. It landed somewhere in the Blue Mts. at 5:31 a.m.

In October 1992, the town of Peekskill, N.Y., was hit by 70 fragments of an incoming meteoroid, from basketball to marble size. One meteorite hit an old car that had been for sale for \$300, transforming it into a car worth \$10,000.

On Aug. 10, 1972, a daytime photo showed an object estimated at 9 to 50 feet in diameter that skipped in and out of the atmosphere, about 37 miles up. Fortunately that large of a meteoroid didn't land.

The meteor crater that we are most familiar with, Barringer Meteor Crater in Arizona, formed when a nickel-iron meteor hit 25,000 to 50,000 years ago. The resulting crater is about ¾ mile in diameter, and almost 600 feet deep. Most meteorites come from the asteroid belt. Jupiter is close enough that every now and then its gravity forces a meteoroid out of orbit. Meteorites tend to be heavier than Earth rocks, are often attracted to magnets, and irregularly shaped. Also, most have "thumbprint" pits and are covered with a thin black or brownish fusion coating. If they've been around a while, the coating may be rusty. They often contain native iron-nickel.

There are many different kinds of meteorites, including multiple groups made entirely or mostly of rock (stony meteorites), some made of a mixture of rock and metal (stony-irons), and some made almost entirely or iron-nickel alloy (irons). Only 6% of all meteorites are irons, but these are the easiest to find.

One percent of meteorites are stony-irons. There are two types. One is a pallasite, where olivine crystals float in a matrix of nickel-iron. The other is a mesosiderite, which is a mixture of half metal and half rock.

Ninety-three percent of all meteorites that fall are stony meteorites, including chondrites and achondrites. There is an average of one on every square mile of earth. Chondrites are by far the most common, and contain olivine-pyroxene and iron sulfide. Often they are filled with rounded bits called chondrules that look like frozen tapioca pudding. The fusion coating on these meteorites is rarely thicker than a fingernail. A few rare stony meteorites aren't chondrites, and are called achondrites (meaning not a chondrite). These include rocks from the asteroids, our Moon, and

Mars. Some of these are distinguished by having an unusual waxy/shiny fusion crust.

Cutting, polishing, and etching an iron meteorite reveals what is called a Widmanstätten pattern, which looks like cross-sections of many triangular crystals. In order for this texture to be large enough to be visible to the naked eye, this meteorite must have cooled very slowly, about 3 degrees every million years. Cutting these nickel-iron-cobalt-steel objects is not easy.

Graphite is not uncommon in meteorites, and it can be metamorphosed into diamonds. A common myth is that meteorites start fires when they land--they don't. In space, a meteoroid is cold. Only a very thin layer is heated during the few seconds that the meteor is incandescent. At about 20 miles up, friction has slowed the meteor down enough that its exterior is no longer hot enough to glow. By the time a meteorite hits the ground, it is somewhere between slightly warm to very cold. People have seen frost forming on a freshly fallen meteorite.

At 8 or 9 feet by 5 feet, the largest known single-piece meteorite on the Earth's surface is the Hoba meteorite in Namibia. It weighs over 60 tons.

Man's first use of meteorites was for weapons and tools. 1500 years ago, long before the Industrial Age, the sword Excalibur must have been stainless steel from a meteorite.

One of the best "scientific instruments" to find meteorites with is a plow. Kansas is flat and plowed; it also lacks dark rocks, so it is a good place to find meteorites easily. Meteorites are harder to locate in Oregon, where black basalt and black meteorites have enough iron in them so both rust.

Many meteors tumble as they come through the atmosphere, but some don't, coming in with one side facing forward the whole time. These meteorites become cone shaped. This fusion-crust cone is often criss-crossed with cooling fractures.

Carbonaceous chondrites are rare. They are high in carbon, and also may contain water, amino acids,

and ketones. They are 4.6 billion years old, and some may have originated in comets.

The meteorites from our Moon contain a lot of different rock types, including basalt, anorthite, and peridotite rocks blasted out from the lunar mantle. Martian meteorites are basalts or peridotites. In 1996, researchers at the Johnson Space Center claimed to have found possible evidence for Martian microbes in these meteorites. This launched a heated debate, and most scientists now find the evidence unconvincing.

Only four meteorites have ever been found in Oregon. One was found in Sam's Valley, north of Medford, Oregon, in 1894; since then, a few more pieces of this iron meteorite have been recovered.

The most famous is the 15.5 ton Willamette Meteorite, found in West Linn in 1902. A local farmer took 3 months to move it from Oregon Iron and Steel land  $\frac{3}{4}$  mile to his own land. The heavily-loaded wagon left easily-followed tracks. Oregon Iron and Steel men followed them, then lost a lawsuit attempting to get the meteorite back. People started trying to take off souvenir pieces of it. Next it was barged to Portland and exhibited in the 1905 World's Fair here. An Eastern lady bought it for \$26,000 and gave it to the Natural History Museum in New York City, where it reposes today. It was probably a glacial erratic, brought down on a really big iceberg during a Missoula flood.

The Klamath Falls iron meteorite was found in 1952 in southern Oregon.

In May of 1981 a chondrite hit a house at 1:05 in the morning in Salem. The Salem meteorite is the only one of the four Oregon meteorites that is not an iron meteorite. It is not surprising that the Salem is a chondrite, as most observed meteorite falls are of chondrites.

## **BOARD MEETING NOTES**

June 6, 2009

GSOC members present included Carol Hasenberg, Larry Purchase, Beverly Vogt, Richard Bartels, Jan

Kem, Dave Olcott, Clay Kelleher, Anne O'Neill, and Janet Rasmussen.

The minutes of the February 13, 2009, Board meeting were approved after the addition of the sentence "A Publicity Committee consisting of Larry Purchase, Rosemary Kenney, Jan Kem, and Tara Schoffstall was appointed". The treasurer's report was discussed and approved.

Equipment for the upcoming field trips was discussed and coordinated. Loose ends for the upcoming President's Field Trip were discussed.

Summer activities are as follows: Meteorite lecture is on June 12. Field trip to wind farms etc. is on June 19 and 20. No July lecture. Clay Kelleher will lead a field trip to Silver Falls State Park on July 11. President's Field Trip is August 1-4. Annual Picnic is at noon on August 30, with board meeting preceding it at 10 a.m. at Carol's house. Bart is exploring a possibility for a September field trip. Fall activities include speakers on September 11 and October 9, and the Gem and Mineral Show on September 20.

For the GSOC annual picnic, Larry will see if the covered area at Mount Tabor can be reserved for the 30th. If not, we can eat in a nearby picnic area that is generally available. The picnic will be a potluck, with the same alphabetic breakdown on what to bring as last year. There will be no children's activities.

To save money, the board voted to make the newsletter bimonthly next year, with a single sheet calendar of upcoming events sent out on alternate months. The board also approved by majority vote to have each issue of the newsletter to be put on the website.

Jan requested that he be sent the calendar, newsletter, posters, and mailing labels by the 20th

of each month so he can get information to the A and E section of the Oregonian in time for it to publicize our Friday night lectures. Also Clay is to send an updated membership list in Word format to board members; and Carol, Janet, Bev, and Bart also want the membership list as an Excel file. Janet will make a list of all GSOC members with email addresses for Tara.

Next Board meeting is 10 a.m., August 30, 2009, at Carol's house prior to the annual picnic. Note change of location.

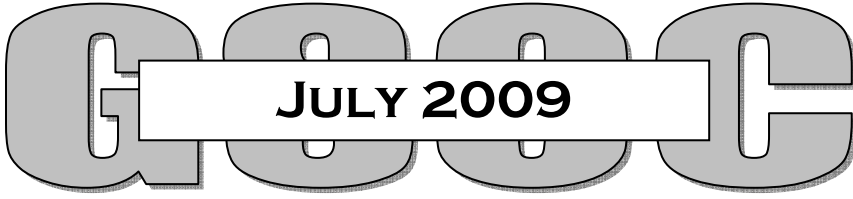
Beverly Vogt, Secretary

## **DECEASED GSOC MEMBER LED QUIET BUT INTERESTING LIFE**

Some long-time GSOC members may remember Marilyn Lum, who used to do all the calligraphy for GSOC certificates. Marilyn died recently at the age of 71. Marilyn was a Portland native whose parents came from Canton, China. An in-depth memoir has been published on the Oregon's website of her life, and can be viewed at [http://blog.oregonlive.com/lifestories/2009/06/\\_marilyn\\_lum\\_wanted\\_to.html#more](http://blog.oregonlive.com/lifestories/2009/06/_marilyn_lum_wanted_to.html#more).

Marilyn had several university degrees, including the fields of education, library science, and occupational therapy. She worked in all these fields, invested well, and retired early. In her retirement, she pursued many activities, including gardening, spinning and weaving, fly fishing, music, astronomy, ham radios and geology. She was a volunteer who worked on projects for a number of causes. According to Joan Harvey of the Oregonian, she "packed several lifetimes into her 71 years."





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**GSOC MINI-CALENDAR**

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**FOR DETAILS, SEE INSIDE**

***Details on July 11 Field Trip to Silver Falls State Park Inside***