



THE GEOLOGICAL NEWSLETTER

"NEWS OF THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY"

VOLUME 75, NUMBER 11
NOVEMBER 2009

The Geological Society of the Oregon Country

P.O. Box 907, Portland, OR 97207

www.gsoc.org

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VISITORS WELCOME AT ALL MEETINGS

CALENDAR

NOVEMBER ACTIVITIES

Friday evening talk, November 13, 2009, at 8 p.m., in Room S17, Cramer Hall, 1721 SW Broadway Ave. (between Montgomery and Mill Sts.), Portland State University: Speaker to be Dr. Scott F. Burns, Portland State University Geology Department Chair, author, and Professional Geologist. Title of the talk is the same as the title of his new book: "Cataclysms on the Columbia: The Great Missoula Floods - a major update". *Note: As of press time, we have applied for a larger room, either Cramer Hall Room 71 or Cramer Hall Room 53. A sign will be posted on the door of S17 should the room change be made.*

Join GSOC members at **Pizzicato Pizza, 1708 SW 6th Ave.**, at 6:30 p.m. before the lecture for an informal dinner and conversation.

Free parking is available at Portland State University Friday nights after 5 p.m. in Parking Structure 2 on

Broadway Ave. directly across from Cramer Hall and on level one of Parking Structure 1, bounded by Broadway and 6th Aves. and Harrison and Hall Sts.

FUTURE ACTIVITIES

Friday evening talk, December 11, 2009, at 8 p.m., in Room S17, Cramer Hall, 1721 SW Broadway Ave. (between Montgomery and Mill Sts.), Portland State University: Topic of the meeting to be "What GSOCers did on their Summer Field Trips," and will feature various GSOC members with slides, rocks, and any other appropriate materials. After the meeting GSOC members are planning a small holiday get-together.

Check the GSOC website (www.gsoc.org) for updates to the calendar.

UPCOMING ACTIVITIES FROM OTHER ORGANIZATIONS

Portland State University Geology Department Fall 2009 Seminar Series, Cramer Hall S17, 3:30-4:30 p.m.. All are invited to attend! For information contact: Scott Burns, 503, 725-3389, burnss@pdx.edu, or refer to the department website: <http://geology.pdx.edu/node/3>

- October 28, 2009, “Geology and Wine in Missouri: Spatial Analyses of Terroirs Using a Geographical Information System and Remote Sensing”, Kathryn Barnard, Ph.D. Student, Dept. of Geology, PSU
- November 4, 2009, “A Petrologic Investigation of Mafic Inputs Into the Augustine Volcano (Alaska) Magma System over the Past 2200 Years”, Arron Steiner, Ph.D. Student, Dept. of Geology, PSU,
- November 18, 2009, Graduate Student Thesis Proposals
- December 2, 2009, “Wenchuan Earthquake in China, May 12, 2008, One of World’s Most Destructive Earthquakes”, Scott Burns, Professor of Geology, Portland State University

Oregon State University Department of Geosciences 2009 Fall Seminar Series, Thursdays, 4:00 pm, 108 Wilkinson Hall, unless otherwise noted. Refer to department website for more information:

http://www.geo.oregonstate.edu/events/SeminarSeries/Seminar_Current.htm

- October 29, Ian Madin, DOGAMI, “Lidar in Oregon: New Data Promises, Exciting Discoveries and Lots of Fun “
- November 5, Doug Kennett, University of Oregon Department of Anthropology, “Climate Change and the Collapse of Classic Maya Society “
- November 12, Julia Jones, Oregon State University “Chaiten Volcano, Southern Chile: Eruption Chronology and Geomorphic, Ecological and Social Impacts “

- November 19, Qusheng Jin, University of Oregon Department of Geology, “Groundwater Arsenic Contamination in Southern Willamette Basin “
- November 26, No class
- December 3, Phil Mote, OSU OCCRI, “New Ways of Imagining Future Climate”

University of Oregon Department of Geological Sciences, Fall 2009 Weekly Seminar Series, Wednesdays, 4:00 to 5:20 pm in 110 Willamette Hall. Tea and cookies are served in Cascade 200 beginning at 3:30 p.m.. Refer to department website for more information:

<http://www.uoregon.edu/~dogsci/news/about>

- October 28 - Margaret Mangan (USGS Menlo Park, CA), “Fire and Ice and the Alaskan Peninsula”
- November 4 - Frank Ramos (New Mexico State University), “Baitoushan Volcano: Evaluating the Complex Relationships of Crystals in Rhyolites”
- November 11 - Olivier Bachmann (University of Washington), “What controls the explosivity of volcanic eruptions?”
- November 18 - Benjamin Ellis (University of Leicester, UK), “Styles and Scales of Snake River-type volcanism”
- November 25 - No Seminar—Thanksgiving Week
- December 2 - Cindy Werner (USGS Cascades Volcano Observatory), topic TBA

EXCURSIONS INTO ZEOLITE COUNTRY

Synopsis of the October 9, 2009, lecture by Rudy Tschernich, Curator of the Rice Museum in Hillsboro, Oregon

Zeolite minerals, whose name is derived from the Greek word “to boil”, were the topic of Rudy Tschernich’s lecture to GSOC last month. Tschernich (pronounced CHER-nick) opened the talk by telling the audience that his 1992 magnum opus, *Zeolites of the World*, was available for free download at the mindat.org website. He did this to

foil scalpers who had been trying to sell the out of print reference for as much as \$400 over the internet.

Zeolites are minerals that have an aluminosilicate ((Al, Si)O₄) three-dimensional framework. Zeolite frameworks are constructed of AlO₄ or SiO₄ tetrahedra which form tubes or other openings. Water or other substances can be captured in these openings by their attraction to the oxygen ions in the tetrahedra. Elements captured in zeolites include Ca, Na, K, Li, Cs, Sr, Ba, and Mg.

Zeolites are used extensively in industry. They have the useful industrial properties of being molecular sieves, facilitating cation exchange, acting as catalysts, and being light in weight. Both natural and synthetic zeolites are used. Specific uses for zeolites include water softening, radioactive waste cleanup, ammonia absorbing products such as kitty litter and feed lot cleaning products, catalysts in oil refining, scrubbers for SO₂ in smokestacks, landfill gas removal, lightweight aggregate in concrete and brick, and many other uses.

Zeolites are formed naturally in several environments characterized by volcanic rock reacting with alkaline groundwater. In a hydrothermal alteration environment water heated at depth over a magma chamber migrates upward and forms minerals in cavities in the volcanic rock above. This is the case for zeolites found in Goble, Oregon. The vertical faults in the rock there provide a path for water to come up and deposit zeolites in vesicular lava flows.

Another environment for forming zeolites is when river valleys fill with basalt. The river water creates a lot of pockets in which zeolites can form. Sodium and potassium migrate into the pockets. Zeolites also can form in contact hydrothermal metamorphic environments and in pegmatites.

Zeolites that are commercially mined are usually found in areas where volcanic ash fell into saline lakes. The salty water over time converted the silicates in the ash into zeolite minerals such as heulandite and analcime. Zeolites can also form in

seawater, but the temperature of the water makes the reactions occur very slowly.

Tschernich's expertise is in finding and identifying natural zeolites. Tschernich displayed a zeolite map of the Pacific northwest to discuss with the GSOC audience. In general, zeolites are not found in the stratovolcanoes of the High Cascades because those formations are too young. But there are lots of older volcanic rocks in Oregon that are rich in zeolites. For example, the Eocene deposits in the Coast Range are excellent hunting grounds. Also, zeolites can be found in the older volcanic areas surrounding the stratovolcanoes. The deserts of eastern Washington are generally not good hunting grounds, because there wasn't enough water to deposit the minerals.

One of the highlights of the Rice Museum is the collection of zeolites that Tschernich found in a quarry near Pe Ell, Washington. The quarry contained several lava tubes that were lined with huge zeolite crystals. Tschernich obtained 90 boxes of zeolites that are now on display at the museum. Another very rich zeolite deposit can be found at a roadcut near Goble, Oregon, near the site of the old Trojan nuclear power plant. Several new species of zeolite minerals were discovered there, including the mineral Tschernichite which was named after Rudy. Several quarries in the Goble area also are rich in zeolites.

Agates and zeolites often form together depending on the amounts of silicate and aluminum that are present in the parent rock. Tschernich has found zeolites in the thunderegg beds in Richardson Ranch near Madras, Oregon.

Tschernich has a research idea for a geology graduate student. He would like to see someone study the zeolites found above and below the water level on the cliff at Oceanside to determine the effect of the ocean water on the zeolite mineralogy. He has noticed calcium rich zeolites above and sodium rich zeolites below in this area.

During the question and answer period, someone asked Tschernich how zeolite species are different and how different species are determined. The

main considerations in a zeolite species are its structure and its dominant cations. The structure can be determined using X-ray diffraction techniques. Zeolite species have a characteristic silicon to aluminum ratio. They can be chemically analyzed for cation content.

There are so many types of and uses for zeolites that it is clear we've only had a brief glimpse of this

fascinating topic. You can download Tschernich's book for a free glimpse of the world of zeolites – it's a meaty 237Mb file. Also, stop by the Rice Museum in Hillsboro to see the fabulous zeolite collection and a whole lot more.

Carol Hasenberg

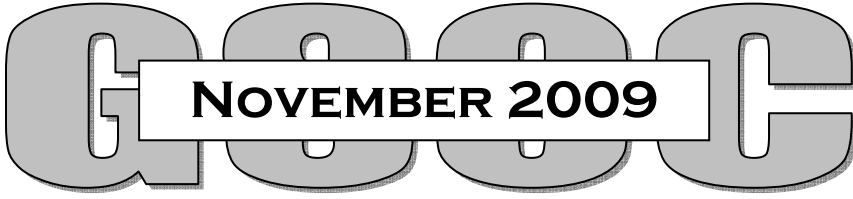
Nominating Committee Results

The following slate of officers has been selected by this year's nominating committee:

President.....	Larry Purchase
Vice President.....	Rik Smoody
Secretary.....	Beverly Vogt
Treasurer.....	Richard Bartels
Director, 3 years.....	Paul Edison-Lahm
Director, 2 years.....	Anne O'Neill
Director, 1 year.....	Dave Olcott

Nominations will also be open at the December club meeting on Friday, December 11, 2009. Consent of the nominees must be secured prior to their nomination. Nominations will be closed after the December meeting. Final nominations will be published in the January newsletter. The slate of officers will be voted on and approved at the February monthly meeting.

The Nominating Committee members are Larry Purchase, chair, Jan Kem and Anne O'Neill. Our thanks to the selected members and members of the Nominating Committee!



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GSOC MINI-CALENDAR

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FOR DETAILS, SEE INSIDE