Arizona Geological Society Newsletter

JANUARY 2018

January 2, 2018 DINNER MEETING

Who: **Dr. Peter Ward** is the featured speaker. See abstract below.

Where: Sheraton Tucson Hotel and Suites, 5151 East Grant Road, (at the intersection of Grant and Rosemont on the North side of Grant in the **SABINO BALLROOM** (enter at northwest corner of the building) and go upstairs to the meeting room.

When: Cash Bar at 6 p.m.—Dinner at 7 p.m.—Talk at 8 p.m.

Cost: Members $30, Guests $33, Students Members free with on-line reservation ($10 without).

RESERVATIONS ARE REQUIRED: Reserve on the AGS website (http://www.arizonageologicalsoc.org/events) by 12pm on Thursday, December 28th. Please indicate Regular (Braised Short Ribs), Vegetarian (Four Cheese Ravioli with Basil and Garlic Cream Sauce) or Salad (Machaca Chicken Salad) meal preference. Please cancel by **Thursday, December 28th at 12pm** if you are unable to attend - no shows and late cancellations will be invoiced.

The January dinner meeting is sponsored by:

Arizonasilver exploration

ABSTRACT
Bringing Peace to the Climate Wars
Peter L. Ward, U.S, Geological Survey retired

All four major analyses of average annual global temperatures show little change from 1945 to 1970, a rapid increase of 0.6 °C from 1970 to 1998, little change from 1998 through 2013, and a very rapid increase of 0.3 °C from 2014 through 2016, making 2016 the hottest year in recorded history. 2017 looks like it will be a little cooler. Meanwhile carbon dioxide concentrations in the atmosphere continually increased with no sudden changes.

In the 1960s, human manufacture of chlorofluorocarbon gases (CFCs) increased rapidly. By 1970, the ozone layer began to be depleted and temperatures began to rise. In 1974, scientists figured out how CFCs could cause ozone depletion. After discovery of the Antarctic Ozone Hole in 1985, the Montreal Protocol was passed mandating cutbacks in production of CFCs starting in 1989. Increases of CFCs in the atmosphere stopped in 1993. Increases in ozone depletion stopped in 1995. Increases in temperatures stopped in 1998.

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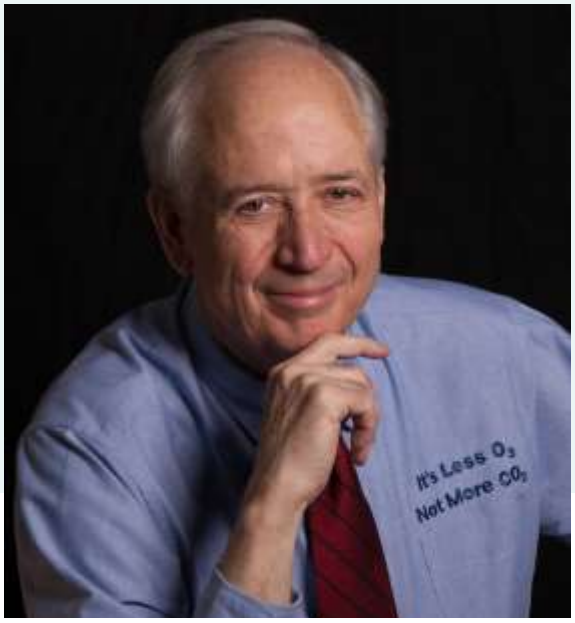
In 2014, Bardarbunga volcano in Iceland extruded basaltic lavas over an area of 85 km^2 in 6 months, the highest rate of basalt extrusion since 1783. Throughout the Holocene and all of Earth history, major eruptions of flood basalts over areas from hundreds to millions of square kilometers have been contemporaneous with major warming, ocean acidification, and mass extinctions. Major explosive volcanic eruptions, on the other hand, that form aerosols in the lower stratosphere reflecting and scattering sunlight, cause 0.5 °C cooling of the ocean surface for 2 to 4 years, affecting ocean temperatures for a century. Several large explosive eruptions per century for millennia are observed to cool the ocean into ice-age conditions. Volcanoes rule climate change.



To warm Earth, you must add heat, which consists of a broad continuum of frequencies of thermal oscillation of the bonds holding matter together. Carbon dioxide absorbs less than 16% of the frequencies radiated by Earth. Carbon dioxide simply does not absorb enough heat to warm Earth. Prior to humans, atmospheric concentrations of carbon dioxide appear to be a proxy for ocean temperature based on well-known solubility curves. We can burn fossil fuels without overheating Earth, but we must control pollution, currently killing at least five million people each year.

ABOUT THE SPEAKER

Dr. Peter L. Ward earned a BA in geophysics from Dartmouth in 1965 and a PhD in geophysics from Columbia in 1970. He worked 27 years with the United States Geological Survey in Menlo Park, California, where he played a lead role in developing and managing the National Earthquake Hazard Reduction Program, developing a prototype global volcanic surveillance system, and studying the relationship between plate motions and the geology of western North America. He received two national awards for explaining science to the general public. Ward chaired a committee at the White House, worked on a committee for vice president Gore, testified before Congress, and his work was featured on Good Morning America. He has published more than 50 scientific papers as first author. In 1998, he retired to Jackson, Wyoming.

Since 2006, Ward has worked full time trying to resolve several enigmatic observations related to climate change. His work is described in detail at WhyClimateChanges.com and in his book What Really Causes Global Warming? Greenhouse gases or ozone depletion? Follow him on Twitter at @yclimatechanges. See some of his talks at WhyClimateChanges.com/videos/talks-about-climate/, including one at TEDx, one at the Geological Society of London and many at national meetings.

Ward raised four children with his successfully blended family being featured in the New York Times Magazine and on the Phil Donahue Show. He has six grandchildren.

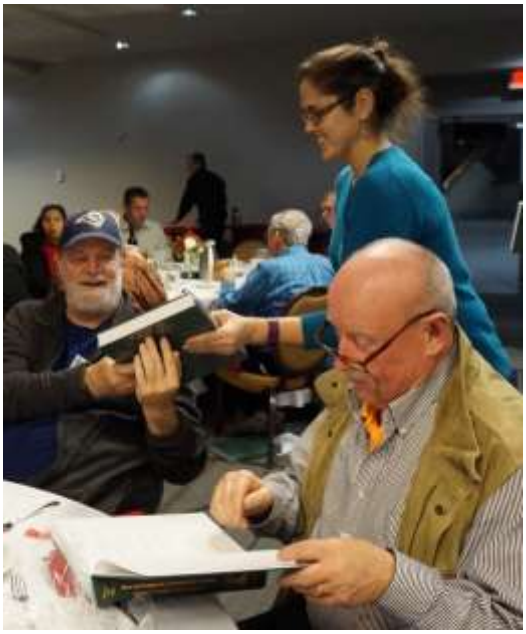
December Dinner Meeting Highlights

In addition to a fascinating talk by Dr. Jo-Ellen Russell, AGS awarded two scholarships and gave away copies of AGS digests as door prizes.

Left: Ann Pattison awards the M.Lee Allison Scholarship award to Jessie Pearl.

Below: Michael Kassela, Courtright Scholarship recipient, says a few words.

Below left: Melanie Lindsey helped distribute AGS Digest 22 "Ores and Orogenesis" which was among the door prizes at the December meeting. Stan Keith (left) and Volker Speith (right) both won copies.



New Dinner Payment Policy

The AGS Executive Committee voted in November to institute a pre-pay policy for dinner meetings, beginning in January 2018. This action was necessary due to the numbers of no-shows who never pay for the meal they reserved, even after frequent reminders. This has resulted in financial losses that are not sustainable for the Society.

For those members who need assistance with navigating the online payment, please contact an officer and we will be happy to walk you through the process.

THANK YOU!

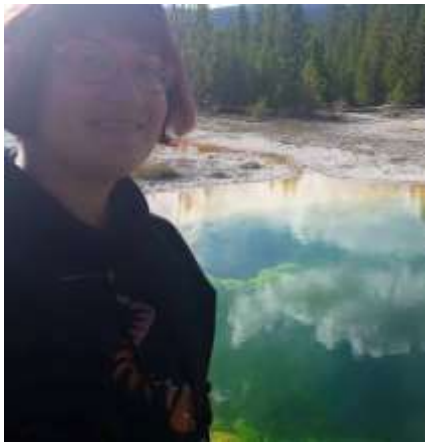
The following AGS members recently made generous contributions to AGS:

Richard Jones—M. Lee Allison Scholarship Fund

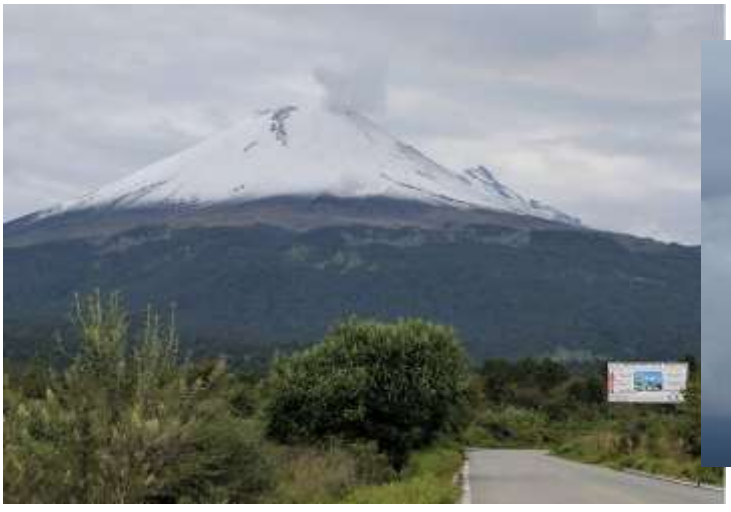
David Briggs—Greatest Needs Fund

Eric Seedorf—Courtright and M. Lee Allison Scholarships

Meet the Arizona Geological Society's Secretary for 2018!



Leandra Marshall has a Bachelors in Geology from University of Arizona and a Masters in Geology and Geohazards from the State University of New York (SUNY) at Buffalo. She conducted her Masters research in the field of Volcanology, using geomorphologic investigations and qualitative laboratory analog experiments to explore the formation of Thousand Lakes Volcano in Northern California. She has been a Geology Educator at Craters of the Moon National Monument in Idaho, a Post-Graduate Intern and Project Coordinator at the Arizona Geological Survey, and a Field Hydrologist at Clear Creek Associates in Tucson. She is currently employed at the environmental consulting firm Haley & Aldrich as a Staff Scientist in their Data Visualization Services Group. As a Staff Scientist, Leandra manipulates and analyzes environmental data for all types of environmental investigations. In her free time, Leandra enjoys visiting volcanoes and national parks. She hopes to obtain a PhD in Volcanology one day. Her hobbies include alternative fashion, antiquing, rockhounding, and hanging out with her two pets: a cat named Lapilli and a dog named Tephra. Here are some photos from Leandra's favorite volcano vacations:



Smoking Popocatepetl in Mexico, July 2017

Turrialba erupting in Costa Rica, November 2016.

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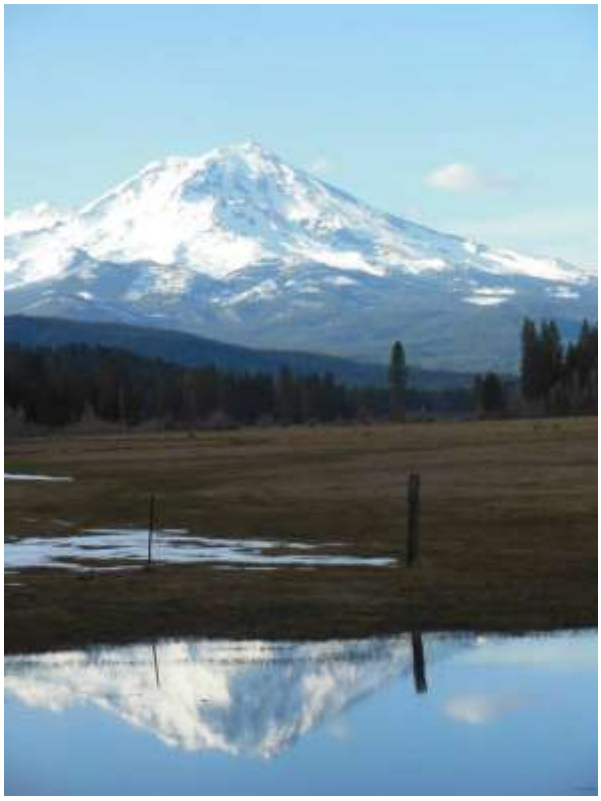
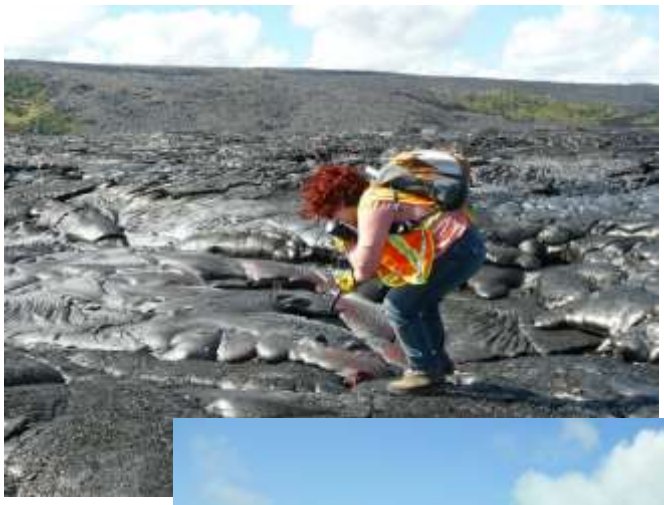
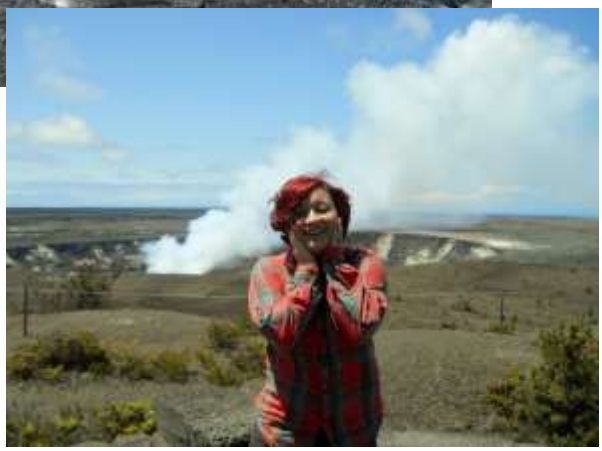


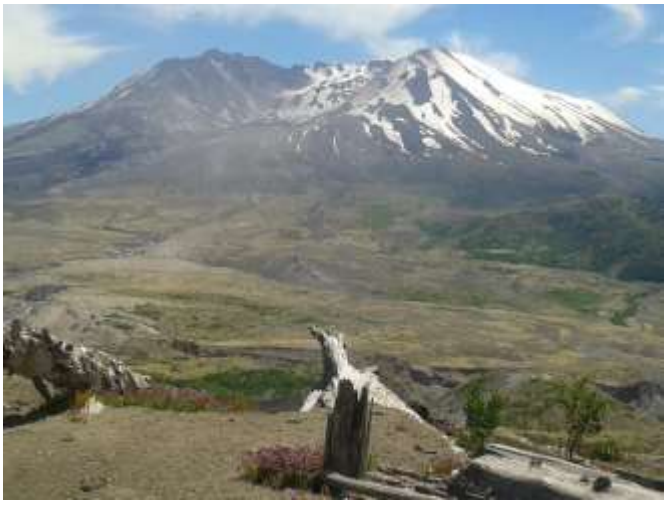


Top and Right:

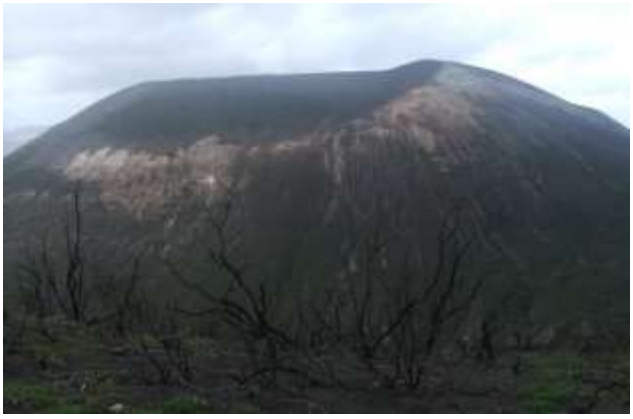
Kilauea in Hawaii, Summer 2012.



Left: Mt. Shasta in California, Spring 2013.

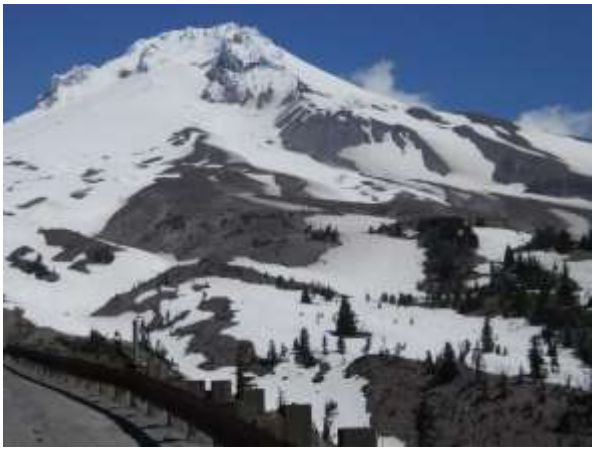


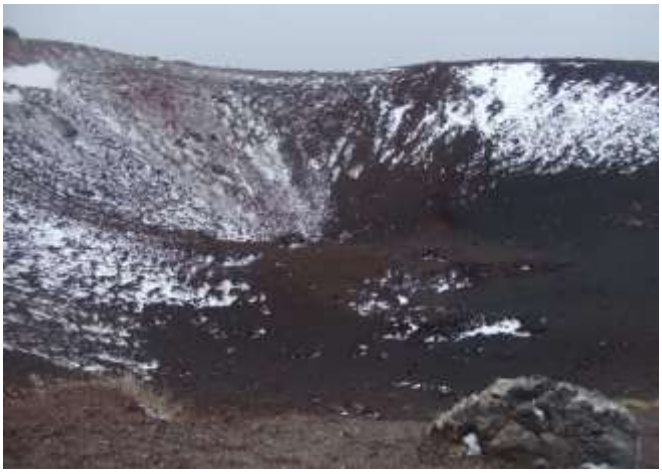
Mt. St. Helens, Summer 2014.



Vulcano in Aeolian Islands, Spring 2008.

Mt. Hood in Oregon, Summer 2011.





Crater on Mt. Etna in Sicily, Spring 2008.

News from the Arizona Geological Survey

Abridged from "Arizona's Proterozoic Geology Revealed: Geologic maps of Phillip Anderson":

Phil Anderson (Ph.D., University of Arizona) had a genius for mapping and interpreting the Proterozoic geology, tectonics, and mineral deposits of the Southwest. Unfortunately, his mapping was never made public until now.

From the mid-1970s to the early 1990s, Phil scoured Arizona's Transition Zone looking for exposures of Proterozoic rocks. He described this work in his 1986 dissertation, 'The Proterozoic tectonic evolution of Arizona', and two subsequent papers published in the Arizona Geological Society's Digest 17, but he did not disclose his geologic maps. He issued, instead, small-scale, state-wide overviews of the distribution of Proterozoic rocks.

According to Reynolds and others (2017), the "Precambrian geologic maps of the Bradshaw Mountains, Central Arizona" represents a significant collection of geologic maps for the Proterozoic of Arizona, and includes.:

Reynolds & others (2017) contextualizing Anderson's contribution to the Proterozoic of Arizona;
11 geologic topographic quadrangles (1:24,000) from central Arizona's Bradshaw Mountains, with key and legend;
A suite of geologic, structural, and tectonic illustrations;
9 sub-regional geochemical plots;
2 papers (totaling 150 p.) authored by Phil Anderson and published in the Arizona Geological Society's Digest 17.

References

Reynolds, S.J, Conway, F.M., Johnson, J.K., Doe, M.F., Niemuth, N.J., 2017, The Phillip Anderson Arizona Proterozoic Archive. Arizona Geological Survey Contributed Report CR-17-D, 2 p.

New Publications at AZGS's Document Repository (repository.azgs.az.gov):

Anderson, P., Proterozoic Geology of the Bradshaw Mountains and environs, Central Arizona. Arizona Geological Survey Contributed Map 17-B, 11 map plates, 1:24,000 map scale.

Reynolds, S.J, Conway, F.M., Johnson, J.K., Doe, M.F., Niemuth, N.J., 2017, The Phillip Anderson Arizona Proterozoic Archive. Arizona Geological Survey Contributed Report CR-17-D, 2 p.

Arizona Geological Survey, 2017, Locations of Mapped Earth Fissure Traces in Arizona, v.11.06.2017. Arizona Geological Survey Digital Information (DI-39 v. 11.06.17), shapefile and Google Earth KMZ file.

Phoenix Geophysics Inc, 1981, Report on the Reconnaissance Resistivity and VLF-EM Surveys of the Safford Valley Area, Graham County, Arizona. Arizona Bureau of Geology and Mineral Technology OFR-81-3, 21 p., 13 line scans and 2 plates. ONLINE for the first time.

Johannessen and Girand Consulting Engineers Inc., 1981, Feasibility Study for Geothermal Water Space Heating for the Safford Federal Prison Camp, Safford, Arizona. Arizona Bureau of Geology and Mineral Technology OFR-81-27

Arizona Geological Survey, 2012, Earth Fissure Map of the Three Sisters Buttes Study Area: Cochise County, Arizona. Arizona Geological Survey Digital Map - Earth Fissure (DM-EF-22 v3.0), 1 map sheet, 1:24,000 map scale

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Arizona's Monsoon Season Drives Earth Fissure Activity

Arizona Geological Survey Geoscientists agree, there is no such thing as an earthquake season. The tectonic forces producing earthquakes are inured from changes in meteorological or astronomical conditions; the latter involves fluctuation in gravitational forces due to the position of Earth's Moon.

Arizona does, however, have an earth fissure season. A season when earth fissures are more likely to first appear or undergo renewed activity. Central and southeastern Arizona's earth fissure season accompanies the onset of torrential rainfall of the summer monsoon, from mid-June to late September, with most precipitation occurring from mid-July to mid-August.

In southern and western Arizona, Cochise, La Paz, Maricopa, Pima and Pinal Counties all host earth fissures. In these five counties, we've identified nearly 30 discrete earth fissure study areas, each with its own history, and comprising a collective 170 miles of mapped fissures and an additional 180 miles of reported but unconfirmed fissures.

On November 6, 2017, AZGS released an updated ESRI spatial data file (.shp) and Google Earth KMZ file, 'Locations of Mapped Earth Fissure Traces in Arizona'.

Please contact the AGS Secretary if your firm is interested in advertising in this monthly newsletter.

~~Welcome New Members~~

Lowell Bartlett
Riley Burkart
Frank Hawkins
Brian Wernicke
Vivian Davidson
Yun Huang
Renzo Yaringaño

Arizona Geological Society is grateful to Freeport-McMoRan, Inc. for their generous support of our student members! Freeport-McMoRan sponsored student dinners for the 2018 AGS monthly meetings.

FREEPORT-MCMORAN

AGS MEMBERSHIP APPLICATION OR RENEWAL FORM

YOU CAN RENEW OR SIGN UP as a new member and pay online. Please go to our website, arizonageological-soc.org. Or use the form below if you are more comfortable with the old school approach.

Please mail check with membership form to: Arizona Geological Society, PO Box 40952, Tucson, AZ 85717

Dues (check box) ☐ 1 year: $35; ☐ full-time student (membership is free)

NEW MEMBER or RENEWAL? (circle one) Date of submittal _____

Name: _____ Position: _____

Company: _____

Mailing Address: _____

Street: _____ City: _____ State: _____ Zip Code: _____

Work Phone: _____ Home Phone: _____

Fax Number: _____ Cellular Phone: _____

E-mail: _____ Check this box if you do not have an email address ☐

All newsletters will be sent by email. If you do not have an email address, we will mail a hard copy to you, but we cannot guarantee timeliness.

If registered geologist/engineer, indicate registration number and State: _____

Enclosed is a _____ tax-deductible contribution to the ☐ J. Harold Courtright or the ☐ M. Lee Allison