



## Association for Women Geoscientists

Puget Sound Chapter

November/December 2006

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### **Message from the Editor:**

Greetings! I realize it has been a very long time since last you heard from me. It has been quite a fast paced spring and summer with no relief in sight as I am sure many of you can relate. As a result of the long time span this newsletter is quite full of information, so please get comfortable and give it a read. Check out what our board is up to and our list of scheduled programs for 2007. Also read about the successful programs of 2006.

As usual if you have any interesting information you want to share in the next newsletter (promotions, publications, book reviews, and interesting websites) or time sensitive meeting notices or job announcements please send them off to me at [blaesis@wsdot.wa.gov](mailto:blaesis@wsdot.wa.gov)

Have a wonderful rest of 2006!

Sincerely,

Shawn Blaesing-Thompson

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### **2006-2007 Chapter Board Members:**

Our slate of officers has been elected. Thank you to all who emailed or mailed in your ballots. Our President is Lynn Moses. Suzanne Dudziak has been appointed Vice President for FY2007. Marcia Knadle is Secretary and Historian. Wendy Gerstel is our Treasurer. Anne Udaloj is our Scholarship Chair. Shawn Blaesing-Thompson is Publicity Chair, Science Fair Liaison and Webmistress. Paula York is our regional delegate.

Projects the Board is working on include improving the scholarship program, offering mini-grants to students, and offering mentoring for young geo-field professionals.

- Anne has brought great energy to the scholarship program and is looking for more corporate sponsorship of the scholarship program so we can offer a larger scholarship possibly beginning in 2008. She would also like to make the scholarship process easier for applicants by using electronic submission.
- Lynn would like to see AWG-PS offer a mini-grant program possibly in cooperation with AEG or NWGS to offer students opportunities for another funding source that might pay for parts of their research process studies.
- Anne has observed that many young professionals don't get good on-the-job training on basic field skills like logging wells. She has proposed starting a mentoring project where young professional women have a safe environment to ask more experienced women field professionals how to develop these skills. She plans to assemble a reasonably sized pool of mentors.

**New volunteers are welcome and needed. If you have ideas or time to share contact any of the board members.**

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## Upcoming Programs:

December 2006 – Tentative AWG-PS Board Meeting – Federal Way

January/February 2007 Programs:

- Geofilm fest
- 2005 AWG Grand Canyon Field Trip Slide Show
- Crafty Geoscientists – Knitting/Crochet or Jewelry Making – We are looking for a centralized venue for either of these activities if you would like to host and share or learn new talents.

March 2007 Program:

- 2006 AWG Iceland Field Trip Slide Show

May 2007 Program:

- May 4-6 Geological Society of America Cordilleran Section Meeting, Bellingham WA – We are also planning a joint reception with AWG/AEG Friday evening the 4<sup>th</sup> and an AWG-PS reception May 5<sup>th</sup> from 5-7.

<http://www.geosociety.org/sectdiv/cord/07cdmtg.htm>

***We need volunteers to help with these GSA events as well as to volunteer at the AWG booth during the meeting. This is a great networking opportunity!! Please contact Lynn Moses if you are interested. W: (360) 709-5462 [president@awg-ps.org](mailto:president@awg-ps.org)***

Summer 2007 Field Trip:

- Possible locations discussed are the OR Coast, Mt. Saint Helens, and Wallowa Mts. in NE OR as possibilities.

Fall 2007 Program:

- Tentative Joint Meeting with AWEF focusing possibly on groundwater remediation.

**What other programs would you like to see us offer in 2007?**

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## Science Fairs:

We had another successful science fair season. We receive a grant from AWGF to cover half of our expenses. If you would like to contribute to the grant (any amount helps \$5, \$10, etc.) you can either contribute to AWG-PS\_Sage\_05-0001r when you renew your membership in December, or send a check to AWG Foundation, Attn: AWG-PS\_ Sage\_05-0001r / Lorraine Manz, PO Box 7364, Bismark, ND 58507-7364

### **Mid Columbia Regional Science Fair, March 9<sup>th</sup>, 2006 – Judge Elaine Brouillard**

**National awardee:** Megan LaRoche (**Received a certificate**), Selah Intermediate School, Selah, WA  
1<sup>st</sup> place for P.S Chapter (**Received a certificate and Geoscience related book**): Victoria Minette, Desert hills Middle School, Kennewick, WA; “Boating on a radiated river”  
2<sup>nd</sup> Place for P.S Chapter (**Received a certificate and Geoscience related book**): Mary Gallant, Christ the King School, Richland, WA; “How firm is our foundation?”

### **South Sound Science Fair, March 18<sup>th</sup>, 2006 – Judges Rob Harris and Heather Vick**

One Award (**Received a certificate and Geoscience related book**) – Becca Christenson, 9<sup>th</sup> grade, Wilson High School, “Spills”

*Second award was not given this year due to lack of entries meeting our criteria.*

## State Science and Engineering Fair, March 31-April 1, 2006 – Judge Wendy Gerstel

### Grades 1-5:

**Maeve McCormick**

**McKenney Elementary, Grade 3, Olympia, WA**

#### “Who Will Stop the Rain?”

In her study, Maeve set out to compare the difference in rainfall amounts reaching the ground through fir trees, deciduous trees (in this case Big Leaf Maple), and a control site not under any forest canopy. Her project began with her own questioning of why it was dry under trees while it was raining. Before beginning the project she researched techniques for capturing and measuring rainfall, using both internet and library resources. She diligently went out in all kinds of weather to gather data for the rainy month of January. Maeve would like to rerun the study with leaves on the maple. Maeve’s display was very colorful, neat, and creative. She presented her data clearly and was eloquent in her explanations.

Maeve receives a certificate from AWG and *Essential Atlas of Physical Geography*, by Barron’s Educational Series.

### Grades 6-8

**Katie Hedrick**

**Kitsap Jr. High School, Grade 7**

#### “Bending Light”

Katie studied refraction of light through different media. She learned that even if you get the expected results, it may not be for the expected reasons. Her hypothesis was that denser material would bend light more than less dense because it slowed down the speed of light more. In compiling and evaluating her results she realized it was because of the greater *difference* in refractive indices between water and oil (over water and vinegar), rather than because of oil’s greater density. She discussed this error in her hypothesis openly and with a curiosity to test it further next time by “stacking” different liquids for multiple comparisons. Katie explained her study with enthusiasm and a clear understanding of the science behind it.

Katie receives a certificate, a \$50 US Savings Bond, and *1000 Facts on Rocks and Minerals*, by Chris and Helen Pellant.

### Grades 9-12

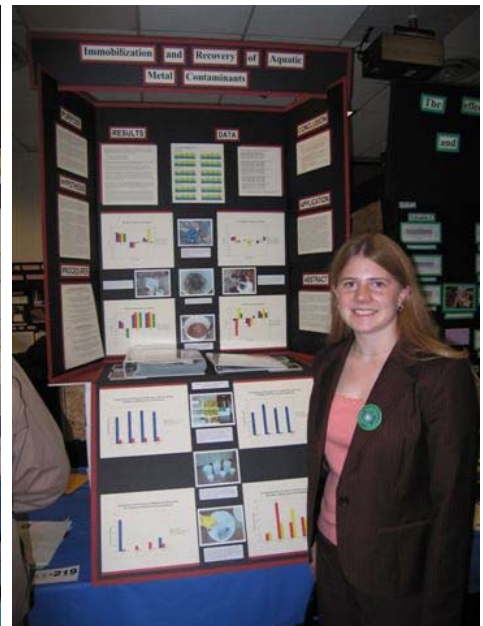
**Morgen Anyan**

**Sela High School, Sela, WA, Grade 12**

#### “Immobilization and Recovery of Aquatic Metal Contaminants”

Morgen used naturally-occurring bacteria collected from a nearby spring to study the rate and efficiency of its ability to fix metal pollutants. Her study was built on the concerns of the State Dept. of Ecology, and allowed her to develop a working relationship with a professional scientist. She did an excellent job explaining the protocol she used and the chemical reactions taking place to immobilize and recover the metals she was measuring. Morgan plans to attend Western Washington University next year and continue her studies in Environmental Sciences. Watch for her contributions to the profession!

Morgen receives a certificate, a \$100 U.S. Savings Bond, and *The Practical Geologist*, by Dixon and Bernor.



## **Seattle AWIS April Program**

In April we had a joint meeting between AWIS, AWEF, and AWG on Climate Change in the Pacific Northwest: Science and Policy Convergence Zone by Dr. Amy Snover

Dr. Snover gave an overview of climate change causes and impacts, planning for climate change, and action that Pacific Northwesterners can take to attenuate the impacts. Changes in climate are already being measured in the Pacific Northwest with heavier more random rains, increased temperature (1.5 °F), and decreased snowfall. We are having dryer dry seasons (fire hazards increase) and wetter wet seasons (more flooding). There are several states in the US that emit more greenhouse gasses than some industrialized countries.

All of these changes are making seasons hit at different times of the year and forcing species to adapt much more quickly or die off. There is also a mismatch of predator prey relationships where prey is maturing too early or late for the predators to benefit. The flooding is having effects on salmon eggs, and effecting salmon migration due to lower flowing warmer waters.

She recommends more planning to help prepare for the impacts of changes happening. There needs to be more monitoring and reporting of climate change, as well as more flexible policies and management of our resources.

Amy K. Snover is a research scientist with the Climate Impacts Group at the University of Washington. Dr. Snover performs integrated assessment of the impacts of both natural climate variability and future human-caused climate change on the natural and human systems of the Pacific Northwest. Her special interests include communication of complex scientific topics and facilitating a mutually beneficial relationship between science and decision making

## **WSDOT Rockfall / Scholarship Award May Program**

Spring Field Trip and Meeting -- May 20, 2006  
Snoqualmie Pass Rockfalls and Stabilization

Last May, Tom Badger (WA State Dept. of Transportation or WSDOT) was kind enough to lead us on a field trip to the troublesome stretch of I-90 where serious rockfalls happened last fall and winter. The first rockfall was relatively small but killed two women as they headed down the west slope from the pass. The other happened a few weeks later further east along Lake Keechelus, but fortunately caused no injuries. Tom showed us where the rockfalls occurred, explained the WSDOT's efforts to respond to and stabilize them long-term, and discussed how their experiences have prompted WSDOT to revisit their rockfall hazard assessments.

The trip up to the pass started out showery and cool, but by the time we all met our leader at the Snoqualmie Pass summit, the weather began to improve. First, we visited the west slope rockfall, about halfway down the steep part of the western descent from the Pass. The rockfall had all been cleared away, but a Jersey barrier still was in place to help protect the roadway from smaller rockfalls. Tom showed us how to "read" the outcrop to assess how joints extend into the mountainside. When the toe of a joint set sloping into the hillside is cut off by a road cut excavation, there may be a considerable amount of rock mass left hanging, kept in place only by friction along the joint planes. If that becomes unstable, portions of the mass may slide along the joint planes down onto the roadway. After removing the looser bits of hanging rock, rock bolts can then be used to tie the hanging mass into the underlying stable rock.

At the Lake Keechelus rock fall, WSDOT had removed loose rock and reinforced large masses, but more could still fall. The rock is also much more jointed and broken up. Here they've also installed cable-net drapes curtains to keep smaller rocks from falling down onto the roadway.

The highlight of the trip was a semi-bushwhacking hike near the east end of Lake Keechelus up to an overlook where we could see the upper portions of a large area that was destabilized when the current highway was installed in the 1950's (?). There's no easy fix to this area because of its size. It's one of the problems that constrain WSDOT's options for widening I-90. The sun was shining by that time, and the wild flowers (including lots of Lady Slippers) were beautiful.

We had dinner in Ellensburg at Rodeo City Barbeque, where we treated our 2005 scholarship recipient, Jennifer Perry and her two young sons to dinner. Tom gave a presentation about Snoqualmie Pass, showing pictures of the rockfalls and the cleanup/stabilization work. He also discussed the options for widening I-90 over the Pass. Then he showed some impressive slides of a large slow-moving landslide along Highway 101.



## **October AWG/AEG Joint Program**

### SHALLOW-LANDSLIDE HAZARD MAP OF SEATTLE, WASHINGTON

By Edwin L. Harp and John A. Michael[1] and William T. Laprade[2] October 19<sup>th</sup>, 2006

#### **ABSTRACT**

Landslides, particularly debris flows, have long been a significant cause of damage and destruction to people and property in the Puget Sound region. Following the years of 1996 and 1997, the Federal Emergency Management Agency (FEMA) designated Seattle as a "Project Impact" city with the goal of encouraging the city to become more disaster resistant to the effects of landslides and other natural hazards. A major recommendation of the Project Impact council was that the city and the U.S. Geological Survey (USGS) collaborate to produce a landslide hazard map of the city. An exceptional data set archived by the city, containing more than 100 years of landslide data from severe storm events, allowed comparison of actual landslide locations with those predicted by slope-stability modeling. We used an infinite-slope analysis, which models slope segments as rigid friction blocks, to estimate the susceptibility of slopes to shallow landslides which often mobilize into debris flows, water-laden slurries that can form from shallow failures of soil and weathered bedrock, and can travel at high velocities down steep slopes. Data used for analysis consisted of a digital slope map derived from recent Light Detection and Ranging (LIDAR) imagery of Seattle, recent digital geologic mapping, and shear-strength test data for the geologic units in the surrounding area. The combination of these data layers within a Geographic Information System (GIS) platform allowed the preparation of a shallow landslide hazard map for the entire city of Seattle.

[1] U.S. Geological Survey, Golden, Colorado 80401

[2] Shannon and Wilson, Inc., Seattle, Washington 98103

## **November 14<sup>th</sup>, NWGS/AWG Joint Program**

### ***"Is there a relationship between middle Miocene Antarctic ice sheet development and the Columbia River Flood Basalts?"***

Amelia E. Shevenell\*, James P. Kennett, and David W. Lea

\*Postdoctoral Fellow, Program on Climate Change, University of Washington, Seattle, WA 98195-7940; ashevenell@ocean.washington.edu

*Talk Details:* The geologic record reveals that Antarctic ice sheets did not become a "permanent" feature on Earth until the middle Miocene (~14 million years ago (Ma)), suggesting a fundamental reorganization of the global climate system at this time. Over the past quarter century, the processes influencing Antarctic ice sheet growth in the middle Miocene have been the subject of scientific debate. Much of what is known about the development of Antarctic ice sheets comes from the oxygen isotope (<sup>18</sup>O) record of fossil foraminifer shells preserved in deep-sea sediments. Although the global oxygen isotope record has been essential for determining the general trend of climate evolution during the Cenozoic (0-65 Ma), <sup>18</sup>O is often difficult to interpret because it contains information about both ocean temperature and ice volume.

Recent geochemical advances have made it possible to separate ice volume and temperature signals contained in the oxygen isotope record by pairing <sup>18</sup>O measurements with measurements of the magnesium/calcium (Mg/Ca) content of the same foraminifer shells, a proxy for ocean temperature. Paired <sup>18</sup>O and Mg/Ca measurements from surface and deep dwelling foraminifers preserved in Southern Ocean sediments were used to assess the phasing of Antarctic ice growth, temperature change, and global carbon cycling during the Middle Miocene climate reorganization. Data reveal that Antarctic ice growth comprises the majority of the global <sup>18</sup>O signal at ~14 Ma and that expansion of the ice sheet commenced during a period of relative warmth and low atmospheric carbon dioxide. Invigorated oceanic/atmospheric circulation, related to the developing ice sheet, may have isolated Antarctica from low-latitude heat and moisture sources and acted as a negative feedback to slow ice sheet expansion. Results suggest that Antarctica was especially sensitive to heat and moisture availability during this interval of low atmospheric CO<sub>2</sub> conditions, reinforcing the fundamental role of CO<sub>2</sub> in the global climate system.

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## Book Reviews

"*Dead Dry*" Sarah Andrew's 10<sup>th</sup> Em Hansen forensic geologist mystery  
Reviewed by Shawn Blaasing-Thompson

This was one of my favorite Em Hansen mysteries of late because it integrated Spatial Analysis and Remote Sensing which being a GIS specialist I have a fondness for, and hydrogeology which we are all getting more of our share of excitement with these days, plus a little romance just for fun. We find Em working for the USGS in Salt Lake City when she is called to a crime scene and finds a former colleague Afton McWain, an eccentric Colorado environmental activist crushed and relieved of all identifying features except for a distinct tattoo.

Em catches a ride with Fritz Calder, a charter-plane pilot friend, to Colorado to let the ex-wife know about the fate of her former spouse, and to find McWain's current live in "nature girl". Both ladies feel they are rightful heirs of McWain's ranch which is slowly being surrounded by doomed development. It turns out there are some water rights/volume issues in an area that can nary support the new volume of inhabitants. Em collects evidence, has some romantic adventures, as well the near death experiences you would expect while finding out a little more about who she is as a person.

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### *The Forecasting of Volcanic Eruptions*

R. B. Trombley

iUniverse 2006 \$13.95 US

84pp charts, figures, and 5 appendices

"Forecasting the time, place, and character of a volcanic eruption is one of the most difficult goals to achieve...This document describes the strides we have made in eruption forecasting in recent years and explores why accurately predicting volcanic events remains difficult." With these words Dr. Trombley begins--what for non geophysicists like myself--is a most unusual How-To book.

At first glance the language and the mathematics look daunting, but there's no reason to panic. (Trust me--I'm so low-tech I crashed my manual typewriter.) The book is written for both volcanologists and laypersons.

For professionals it is an introduction to his developing computer model, "Eruption Pro 10.6". He discusses the problems and shortcomings of current knowledge. And--since a model is only as good as the data fed into it--explains why his is but another step forward.

Following a general introduction to volcanic hazards and methods of eruption forecasting/prediction, he explains what his model is, what it does, how it does it, and why. Basically: this is what it does, this is what it measures, and this is why it matters. The hows are explained with both mathematical formulae and with straightforward narrative understandable to anyone with a basic knowledge of geological processes. One of the appendices is a glossary that leaves no doubt what he is talking about.

Other volcanologists may disagree with and offer suggestions for improving his model. Geophysicists may suggest better formulae. Non-earth-scientists can have a guide to understanding eruption forecasting/prediction that they, be they emergency planners, hazard management consultants, urban/regional planners, elected officials, reporters, and even disaster-fiction writers, can comprehend.

I recommend it to anyone who needs to know what's up with the local volcano. And most important, what can be predicted and what cannot and why.

Reviewed by:

Janet M. Tanaka

Geohazard Consultant, ret.

Puget Sound AWG

### Featured Park: Ice Age Floods National Geologic Trail

Thousands of years ago enormous Ice Age floods carved a broad swath across a four-state region in the Pacific Northwest. The story of these cataclysmic floods may soon be told through a National Geologic Trail.

Glacial melt water flowed into ice-dammed lakes. The largest one--Glacial Lake Missoula--covered an area twice the size of Rhode Island. Water and ice from Lake Missoula, which would have filled half of Lake Michigan, swept forth across the land as glacial dams repeatedly broke open. These floods are believed to have begun as early as 2.6 million years ago, at the onset of the last Ice Age, and ended around 13,000-15,000 years ago. Today, their evidence can be seen along a 600-mile path stretching from western Montana to the Pacific Ocean, with the greatest concentration of flood features in eastern Washington State.



© Bruce Bjornstad

Recently, NPCA, members of Congress, and many others have come together to support national recognition of these cataclysmic events. Senator Maria Cantwell (D-WA) and Representative Doc Hastings (R-WA) introduced legislation supporting the creation of a national geologic trail to be overseen by the National Park Service. Both bills passed and a final bill will soon be sent to the President. If signed, the Ice Age Floods National Geologic Trail would be the first of its kind in the National Park System.

**Watch our slideshow** for a tour of the proposed trail and highlights of its amazing natural features >>

For additional scenes from the flood's path, visit [D.J. Bradley Photography](http://www.djbradley.com)

Colleagues,

--Just wanted to be sure that all of you had a chance to view this slideshow of flood damage at Mount Rainier.

<http://www.kgw.com/slideshows/112006park/1.html>

Carolyn L. Driedger  
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## **AWG Puget Sound Officers and Chairs, 2005-2006**

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