ALASKA GEOLOGY

Newsletter of the Alaska Geological Society, Inc.

The July-August 2008 Hydrovolcanic Eruption of Okmak Volcano, Umnak Island, Alaska

Christina A. Neal
U. S. Geological Survey / Alaska Science Center / Alaska Volcano Observatory, Anchorage, AK

Jessica F. Larsen
Geophysical Institute, Fairbanks, AK

Janet Schaefer
Alaska Volcano Observatory / AK DGGS, Fairbanks, AK

Note: AGS meetings will be at the BP Energy Center for 2008-2009.
Please check the website (www.alaskageology.org) and issues of the AGS newsletter for updates.
This newsletter promotes the January luncheon talk of the Alaska Geological Society, to be held Thursday, Jan. 15th at the BP Energy Center.

Okmok Volcano, dominated by a 10-km-diameter, late-Holocene caldera on Umnak Island in the eastern Aleutian arc, erupted suddenly and violently on July 12, 2008. The eruption began only hours after a subtle onset of increased earthquake activity, sending a tephra- and gas-rich column to 15 km above sea level. This opening explosion was followed within an hour by a more water-vapor-rich eruption column to 16 km. For the next 5 weeks, the eruption waxed and waned in intensity of ash production from multiple vents on the caldera floor. The eruption was dominantly hydrovolcanic in character as abundant water from lakes and shallow groundwater inside the caldera interacted with rising magma to generate powerful, steam-rich explosions that produced tephra fall and base surges, roiling ash and steam from new explosion craters, and a tuff cone. Accumulation of many tens of meters of fine-grained tephra has significantly altered the Okmok landscape (Fig 1). Coalescing explosion and adjacent collapse craters eventually filled with groundwater and surface runoff to form a new lake 0.6 km^2 in area. A 250 to 300-m-high tuff cone grew at the longest-lived 2008 vent on the northwest flank of pre-existing Cone D in the north-central portion of the caldera. We suggest that rapid and voluminous withdrawal of groundwater during the eruption caused formation of a field of collapse craters that pock the 2008-tephra mantled surface of the 1958 lava flow north of the vent cluster. Early in the eruption, lahars were generated as heavy rain rapidly eroded new tephra deposits on the flanks of the volcano. Lahars traveled across the upper slopes of the volcano and down all major drainages; several of which received enough material to create significant—although likely ephemeral—deltas at the shoreline.

Alaska Geological Society Luncheon

Date & Time: **Thursday, Jan. 15th, 11:30 am – 1:00 pm**

Program: **2008 Eruption of Okmak Volcano, Umnak Island, Alaska**

Speaker: Christina Neal, USGS / AVO

Place: **BP Energy Center**

Reservations: **Please make your reservation before noon Tuesday, Jan. 13th, 2009.**

Cost:

Seminar only, no meal:	**Free**
Reserve a box lunch:	**$13**
Nonmember:	**$15**
Reserve a hot lunch:	**$20**
Nonmember:	**$22**

No reservation: add $5 to the above (on an "as-available" basis only)

E-mail reservations: **vp@alaskageology.org**
Or phone (907) 230-1672
(Tom Morahan, AGS VP)

For more information: visit the AGS website:

www.alaskageology.org

The bulk composition of the 2008 tephra is slightly more silicic (~55-57% SiO2) than most basaltic andesites erupted at Okmok in the last 2,000 years. The 2008 eruption was also a significant departure in style from the most recent historical eruptions, all of which occurred at Cone A, a 240-m-high cinder and spatter cone, in the topographically higher southwestern sector of the caldera. Eruptions from Cone A in 1945, 1958, and most recently in 1997, involved lava fountaining, ash clouds as high as 6 km above sea level, and basaltic-andesite ‘a‘a lava flows across the caldera floor. The 2008 eruption in contrast was far more explosive, produced more fine-grained tephra, and lacked a lava flow, all characteristics consistent with eruption through a much wetter, near-surface regime compared to 20th century eruptions. The 2008 eruption is similar to the opening phase of the 1817 Okmok eruption, which involved hydrovolcanic explosions from an arcuate fissure at the base of the north caldera wall. Fieldwork planned for 2009 and beyond will allow us to examine in detail the complex sequence of pyroclastic fall, surge, and other deposits from the 2008 eruption, the first dominantly hydrovolcanic eruption in the United States since the Ukinrek Maars formed on the Alaska Peninsula in 1977.

Impacts from the 2008 Okmok eruption were most severe in several Aleutian communities that were effectively cut off from air travel for many weeks due to nearly constant ash production and contamination of flight routes in the region. Unalaska/Dutch Harbor was dusted with ash on several occasions and air traffic into the Dutch Harbor airport was briefly halted at the start of the eruption. The ash, gas, and aerosol cloud from the July 12 event temporarily disrupted air traffic across the North Pacific and was visible to pilots in the lower 48 states several days later. With assistance from a fishing vessel, the Fort Glenn ranch caretaker family on Umnak Island escaped unharmed during the hours following the eruption onset. As of mid-September, cattle and reindeer populations on the island appeared unharmed; however, reduced forage due to burial by ash may increase winter mortality. AVO received some interesting accounts from fishermen of drastically altered seafloor conditions several miles from Crater Creek on the northeast coastline of Umnak Island, which is likely explained by submarine mass-flowage events triggered in the offshore fronts of lahar deltas .

The Okmok eruption of 2008 is striking for its abrupt onset. Despite the volcano being well-instrumented with real-time seismic and geodetic networks, AVO learned of the eruption from the U.S. Coast Guard, who had been contacted by the Fort Glenn family fleeing the ash fall. These same monitoring networks, however, in combination with AVO’s satellite remote sensing program and geologic understanding of Okmok’s eruptive history, enabled AVO to carefully track and interpret the protracted event in support of public safety until the eruption ceased on August 19.

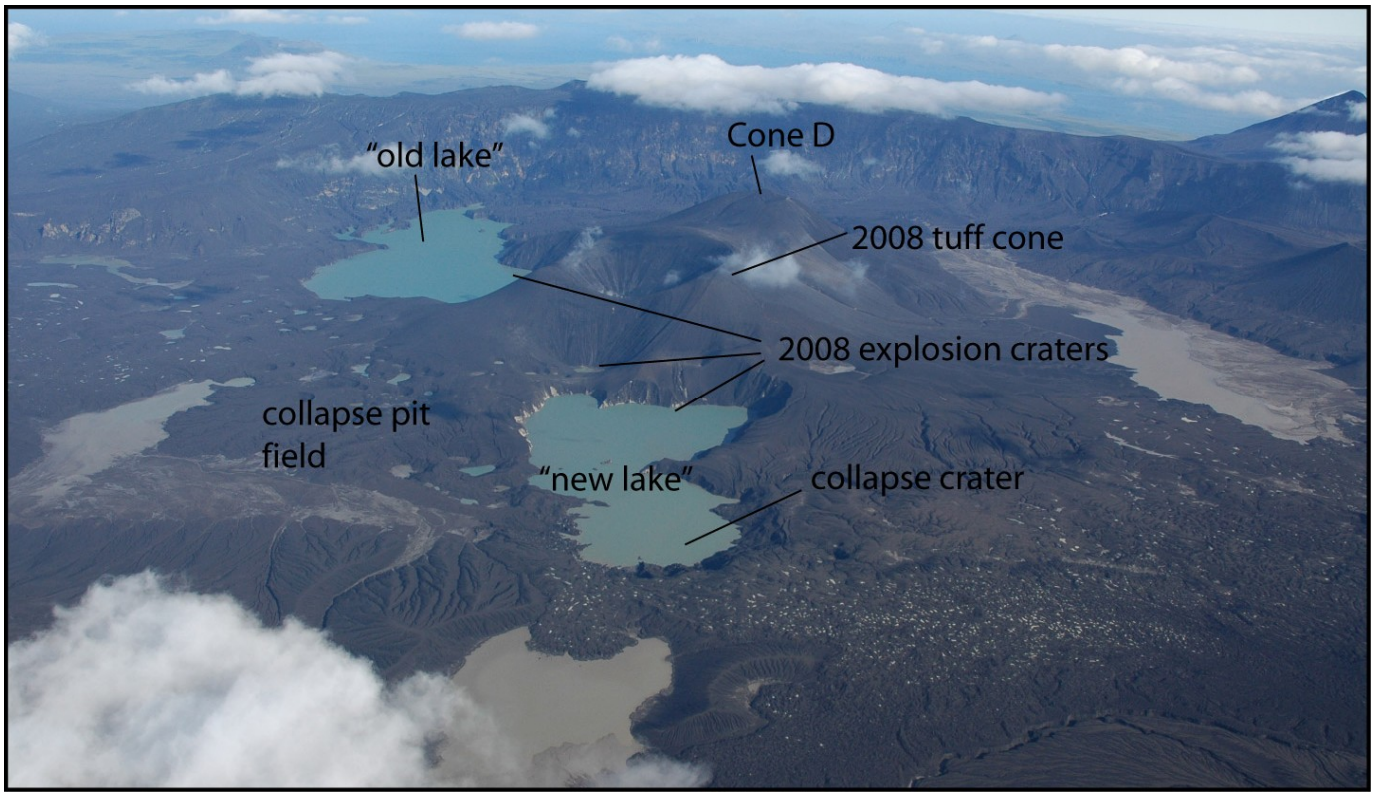


Figure 1. Post-eruption oblique aerial photograph of Okmok Caldera, looking southeast. Principal landforms created during the 2008 eruption are labeled. The summit crater of the 2008 tuff cone is 750-800 m in diameter. Cone D is a pre-eruption spatter cone that has not erupted for hundreds of years. The speckled terrain at lower right is created by small ponds of water atop the very fine-grained ash fall that mantles the rough surface of the 1997 ‘a‘a lava flow. USGS photo by C. Neal, September 14, 2008

ABOUT THE AUTHOR

Christina (Tina) Neal is a research geologist with the U.S. Geological Survey's Alaska Volcano Observatory (AVO) at the Alaska Science Center in Anchorage. She began her career with the USGS in 1983 at the Hawaiian Volcano Observatory working on Kilauea Volcano. In 1990, Tina joined the relatively new AVO at the end of the Redoubt eruption. Since then, she has participated in various mapping efforts and studies of eruptions and unrest at Redoubt, Spurr, Aniakchak, Black Peak, Semisopochnoi, Augustine, and Okmok volcanoes. She is an expert on volcanic ash and aviation safety and interagency coordination during volcanic eruption response. From 1998-2000, she served as Geoscience Advisor to the Office of U.S. Foreign Disaster Assistance (USAID/OFDA). In 2004, she spent 2 months as a Science Fellow at the US Embassy in Quito, Ecuador working on volcano hazard mitigation. Tina also leads USGS/AVO's cooperative work with Russian volcanology counterparts in the Russian Far East. Originally from Connecticut, she has a Sc.B. from Brown University (1981) and an M.S. from Arizona State University (1986), both in Geological Sciences.

The Alaska Geological Society

LUNCHEON SCHEDULE 2008 - 2009

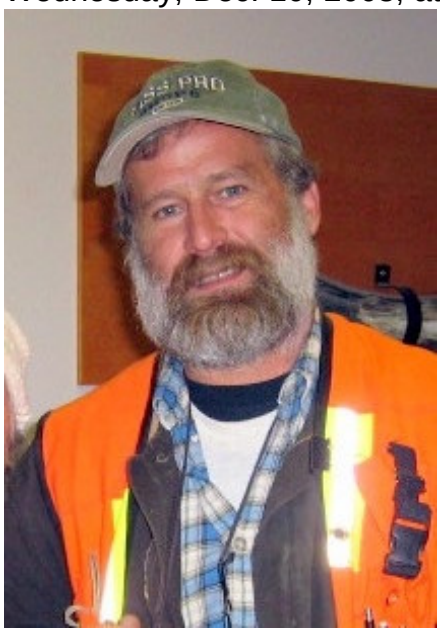
Updates on the web at:
http://www.alaskageology.org

September 2008	Thurs., Sept. 11th Tom Homza An Introduction to the Petroleum Geology of Part of the 'Western Beaufort Sea
October 2008	Thursday, Oct. 23rd Peter Haeussler, USGS, Submarine Slope Failures Near Seward and Valdez, Alaska, During the 1964 Earthquake, and Implications for Local Tsunami Generation
November 2008	Thursday, Nov. 13th , Kirk Sherwood, MMS, Chukchi Sea, Alaska – Exploration History and Petroleum Potential
December 2008	Thursday, Dec. 11th , David Houseknecht, USGS, Brookian Sequence, Arctic Alaska
January 2009	Thursday, Jan. 15th, Tina Neal, USGS / AVO, 2008 Eruption of Okmok Volcano
February 2009	Thursday, Feb. 19st, Gerald Dickens, AAPG Dist. Lect. / Rice University, Early Cen. Climate and Carbon Cycling: The Sed. Record of Global Warming and Massive Carb. Input
March 2009	Thursday, March 19th, Trond Torsvik, Arctic Tectonics Seminar
April 2009	Wednesday, April 22nd, Steve Jones, BP, Liberty Field Development
May 2009	Thursday, May 21st, Open

Obituary

Dr. John M. Murphy

Fairbanks resident John Mathew Murphy, 50, died Wednesday, Dec. 10, 2008, at home with his wife in attendance.



John was born April 24, 1958, in San Luis Obispo, California, to James and Dorothy Murphy. He graduated from South Pasadena High School in 1976. He was awarded a Bachelor of Science degree in geology in 1982 from Humboldt State University, in Arcata, California; a Master of Science degree in geology from the University of Alaska Fairbanks in 1989; and a doctorate degree in geology/geochronology from La Trobe University in Melbourne, Australia in 1993. He married Laurie Murphy (Thomsett) on June 14, 2007.

John was a self-employed geological consultant for numerous oil, gas and mining companies operating worldwide and in Alaska, between 1989 and November 2008, with his most recent work conducted for Fairbanks Gold Mining at the Fort Knox mine and exploration work for Full Metals Mining in southwest Alaska, an

area where John had completed his Master of Science thesis. John was a recognized expert in rock age dating using a specialized technique he acquired while completing his doctorate thesis in 1993 as he deciphered the geochronology of Interior Alaska. While at UAF John was an intern for the State of Alaska, Division of Geological & Geophysical Surveys. From 1994 to 2003, John was an Associate Professor at University of Wyoming in Laramie, where he guided and funded several graduate students on fission track age dating. John was recently hired as Senior Resource Manager for Doyon Lands in Fairbanks. John worked with many geoscientists both in industry and academia and his collaborative works resulted in numerous publications in scientific journals.

John was passionate about everything-geology, politics, skiing, dancing with his wife, music, family, relationships, and just life in general. He taught many how to enjoy life, how to play and have fun. He was insightful and sensitive, and was always stopping to help people in whatever need they had. He was a gentle teacher and glowed as any "student" grasped a new concept.

John is survived by his wife, Laurie Murphy; two daughter's from a previous marriage, Casey Murphy of NY, New York and Danielle Murphy of Golden, Colorado; stepson, Brad Thomsett; stepdaughter, Emily Thomsett, step grandson, Jacob Thomsett House all of Springfield, Missouri; grandmother Mary Warren age 96, of Cambria, California; mother and stepfather, Dorothy and Bob Lucas of Santa Barbara, California.; brothers and sisters, Cindy Murphy of Santa Cruz, California; Colleen Murphy of Cambria, California; and James Murphy, Esq. of Rancho Palo Verdes, California. John was preceded in death by brother, Patrick Murphy; and father James A. Murphy.

The family of John Murphy has established in his honor the **John M. Murphy Geology Scholarship** at the University of Alaska Fairbanks. Anyone wishing to participate may send their donation to: **UAF John M. Murphy Geology Scholarship**, C/O UAF Development Office, P.O. Box 757530, Fairbanks, AK 99775, by phone at 907-474-2619, Online: www.uaf.edu/giving.

Meeting Information:
These links were all active as of 03/08/08. Please send updates to the editor: Greg Wilson 263-4748, or e-mail to Gregory.c.wilson at conocophillips.com

The **American Geological Institute** provides a comprehensive list of national and international geoscience meetings at: **http://calendar.agiweb.org**

Local Meetings:

American Water Resources Association—Alaska Section
http://www.awra.org/state/alaska/index.html

Alaska Geological Society
http://www.alaskageology.org
Lunch meetings are held monthly September through May in Anchorage. For more information, contact Jim Clough, 451-5030.

Alaska Miners Association
http://www.alaskaminers.org/
The Anchorage branch of the AMA holds weekly meetings at 7 AM every Friday at the Denny's on Northern Lights and Denali. They hold regular luncheon meetings in association with SME. For more information, contact the AMA office at 563-9229.

American Institute of Professional Geologists
http://www.aipg.org
AIPG holds regular quarterly evening Section meetings in Anchorage and Fairbanks. For more information contact Mark Lockwood, President, at Shannon & Wilson, Inc., in Fairbanks, 907-460-7239.

Chugach Gem & Mineral Society
http://www.chugachgms.org
CG&MS holds all meetings at the First United Methodist Church on 9th Avenue. Contact their hotline at 566-3403 for information on regular monthly business meetings, monthly potlucks, and guidebook sales, including the new Alaska Rockhound Guidebook.

Geophysical Society of Alaska
http://gsa.seg.org/
Luncheon meetings are held monthly September through May at the ConocoPhillips Tower. For more information, contact Monte Mabry, 265-1653

Society of Petroleum Engineers
http://alaska.spe.org/
For more information, contact Jack Hartz at 375-8239.

UAS Environmental Science Program
http://www.uas.alaska.edu/envs

National Association of Geology Teachers (NAGT)
http://www.nagt.

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A spreadsheet file of wells and curves is available from Daniel E. Shier, dan@rockypine.com, www.rockypine.com

From the President's Desk ….

Dear AGS Members,

As we closed out 2008 with the December AGS luncheon, temperatures were a seasonable -10° to +10° F in Fairbanks. As I write this note at the beginning of 2009, the temperatures have plummeted in both Fairbanks and Anchorage and now much of the state is under the grips of a "normal" old-fashioned cold snap. At least we have passed the winter solstice and the days are getting longer. So, welcome to the second half of the 2008-2009 Alaska Geological Society activities. Tom Morahan has worked hard to ensure an interesting line-up of speakers for the January through May luncheons and Pat Druckenmiller is actively organizing the April 24 AGS Tech Conference in Fairbanks. We would also like to report that the December 11, 2008 ballot vote on the change to the Alaska Geological Society bylaws passed by an overwhelming margin.

Stay warm and Best Wishes for 2009,

- Jim

The Alaska Geological Society, Inc.
P.O. Box 101288
Anchorage AK 99510

On the web at: http://www.alaskageology.org

The Alaska Geological Society is an organization which seeks to promote interest in and understanding of Geology and the related Earth Sciences, and to provide a common organization for those individuals interested in geology and the related Earth Sciences.

This newsletter is the monthly (September-May) publication of the Alaska Geological Society, Inc. Number of newsletters/month: ~300

EDITOR
Greg Wilson
ConocoPhillips Alaska, Inc.,
P.O. Box 100360
Anchorage AK 99510-0360
e-mail: Gregory.c.wilson at conocophillips.com
(907) 263-4748 (office)

MEMBERSHIP INFORMATION

AGS annual memberships expire November 1. The annual membership fee is $15/year. You may download a membership application from the AGS website and return it at a luncheon meeting, or mail it to the address above.

Contact membership coordinator Mark Olson with changes or updates (e-mail: mark.a.olson at conocophillips.com; phone: 907-263-4250)

All AGS publications are now available for on-line purchase on our website. Check to see the complete catalogue.
http://www.alaskageology.org/publications/

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1mo rate=(9mo rate/9)+$40 (rounded up).

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Renew Your Membership!

All memberships not paid in advance are due November 1st of each year. Check the status of your membership on the mailing label of your Newsletter. Membership gets you reduced luncheon and Tech Conference registration, plus your monthly Newsletter.

2008 - 2009 Alaska Geological Society Board

Note: e-mail addresses now contain “at” instead of “@” Please change to @ when typing.

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