



Three Unique Outburst Floods Associated with the Recent 17-year Surge Cycle of Bering Glacier, Alaska

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January Special
Two Abstracts,
Two Talks
See Coakley, p. 4

Bering Glacier surges have been recorded since 1900 AD, with the surge events operating on an approximately 20-year cycle. Bering Glacier began a surge cycle in 1993 with uplift, ice deformation and rapid advance (maximum of 7.4 m/day) into Vitus Lake. Surges are attributed to increased water pressure when water is trapped in isolated conduits at the base of the ice. During the last surge cycle, three different locations show evidence of catastrophic flooding events.

An abrupt termination of the 1993-94 surge occurred on July 27, 1994 when a catastrophic outburst flood issued from the eastern terminus of Bering Glacier and was released into Tsivat Lake. This high magnitude event carried large icebergs that were trapped in the extensive outwash sediments that filled the Tsivat basin. This flood caused the cessation of the surge, and likely occurred when isolated conduits became connected into an integrated subglacial channel system that carried flood waters to the glacier terminus.

The Ancient Forest site was discovered in 1998, literally melting out of the glacier, along the shoreline of Tashalich Arm (the far western

AGS Luncheon

Date & Time: Jan. 17th, 11:30 am – 1:00 pm

Program: Three Unique Outburst Floods
Associated with the Recent 17-year
Surge Cycle of Bering Glacier, AK

Speaker(s): Kristine J. Crossen, University of
Alaska Anchorage

Place: BP Energy Center

Reservations: Please make your reservation before noon
Tuesday, Jan. 15th, 2013.

Cost: Seminar only, no meal: Free

Reserve a box lunch: \$15

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On an "as-available" basis only

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portion of Vitus Lake). The rooted stumps and peat beds were dated between 2200 and 1400 BP, and were subsequently buried by lacustrine, outwash and till sediments. A previously undocumented outburst flood occurred at this site, on the opposite side of the terminus from the 1994 outburst flood, but likely occurring about the same time. Evidence for this event lie in the 20 m deep channel eroded across the Ancient Forest site as well as the forest peat blocks imbricated on large erratic boulders.

The ice steadily retreated between 1995 and 2005, and then it became obvious that the ice-dammed Tsiu Lake, along the eastern margin of the ice, would be drained by an outburst flood. During the summer of 2006, the level of Tsiu Lake level rose during the summer melt season and the lake began to drain unexpectedly through an englacial channel. As the lake level dropped 17 m, the source of the Abandoned River came beheaded and the floor of Tsiu Lake became exposed, revealing the sediment package that filled the lake basin as well as a forest formerly located under Tsiu Lake and Bering Glacier.

The most recent surge cycle began in 2010, and by 2011 the ice had advanced into the basins of both Vitus and Tsiu Lakes. The outlet of Tsiu Lake was again dammed by ice, the lake level rose, and the Abandoned River again served as an outwash channel.



Photo Caption: A series of 4 lakes are shown along the eastern margin of the Bering Glacier. The closest lake, Hanna Lake, was unaffected by the 1993-95 surge event. The second basin, Tsvat Lake, was filled with sediment by the catastrophic flood in 1994. The third basin, Tsiu Lake, was emptied by an outburst flood in 2006. The eastern side of Vitus Lake is in the distance.

About the Speaker:

Kristine J. Crossen is a Professor of Geological Sciences at the University of Alaska Anchorage. Her specialty is Quaternary geology with research on glacial geology and geoarchaeology. Her research has included the Little Ice Age history of 15 glaciers on the northern Kenai Peninsula, and the Holocene history of Bering Glacier.

She has acted as the geoarchaeologist on the Broken Mammoth early man site and as the geologist at Qagnax Cave on the Pribilof Islands. Her current projects include the deglaciation and subsequent rebound of Knik Arm, and the deglacial history of Glacial Lake Ahtna.

From the President's Desk:

Neither rain, nor wind, nor dark of night appears to be able to keep the AGS from its primary goal of keeping a steady stream of continuing and relevant geological information accessible to its members. And this year we can add in the ill-interpreted predictions of cosmic demises, also.

No small number of Doomsayers seem to have had a proud field day applying their prejudices and bias towards the manipulations of the predictive capacities of long gone cultures. The ensuing media foohforaw has been entertaining. But it illustrates how bias can mislead the nature and interpretation of extant data. We're all in the business of gathering, generating and interpreting data. Hopefully our capacities to accumulate these incredible amounts of data do not exceed our abilities to check and recheck its reliability and applications. Years of experience shows that wrong interpretations can be corrected with good data, whereas being biased is more difficult to remediate. Hubris often precedes nemesis... or other kinds of so-called dark stars that doomsayers routinely predict will come our way in the future.

Fortunately, we're more concerned with lengthening daylight and the opportunity to go out and enjoy some of the benefits of living in Alaska. Let's hope the Weather Company cooperates with us on a regular basis. I'd hate to miss out on any hiking, skiing, skating or even looking for meteors from the Qantarids this month. But be sure to make time for Dr. Crossen's Bering Glacier presentation.

- Art



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MCS Data Set Across the Transition between the Chukchi Borderland and the Chukchi Shelf

Bernard Coakley, University of Alaska-Fairbanks

The Chukchi Edges project was designed to establish the relationship between the Chukchi Shelf and Borderland and indirectly test the theories of opening for the Canada Basin. During this cruise, ~5300 km of 2D multi-channel seismic profiles and other geophysical measurements (swath bathymetry, gravity, magnetics, and sonobuoy refraction seismic) were collected from the RV Marcus G. Langseth across the transition between the Chukchi Shelf and Chukchi Borderland.

These profiles reveal extended basins separated by faulted high-standing blocks. Basin stratigraphy can be segmented based on gross stratal geometry, reflection terminations and inferred unconformities. The wedge-shaped synrift sequences terminate against the basement highs and/or major faults, burying the basement topography. The inferred postrift seismic units are more nearly tabular, but thicken locally due to compaction of underlying synrift sediments.

Reflection character is dominated by alternating high and low amplitude continuous reflectors which may be consistent with pelagic or turbidite sediments. Chaotic units are also observed, which may indicate mass-flow deposits. The truncated sediments over the basement highs of the Chukchi Shelf, Chukchi Plateau and Northwind Ridge suggest major erosion due both to glacial planation and earlier erosional events perhaps associated with basement uplift prior to or during rifting and extension.

It is believed that the bulk of the synrift sediments are Mesozoic in age. Certainly Cenozoic sediments are also preserved in these basins, but the position of the boundary is uncertain. Locally, continuous reflectors are observed underlying the rift basin fill. These older units, of very uncertain age, would, if sampled, provide constraint on the history and affinities of the Chukchi Borderland.

In addition to the extensional basins, a number of small symmetric basins are observed, on the flanks of the Chukchi Plateau. These basins may be transtensional and argue for a 2nd phase of tectonism, which overprinted the obvious extensional fabric of the Borderland. This is supported by the observation of uplifted synrift sediments on the flanks of some of the intermedial basement highs.

More detailed information on this cruise is available through the author's blog at the NY Times website;
<http://scientistatwork.blogs.nytimes.com/author/bernard-coakley/>

Speakers Biography

Dr. Coakley was born and raised in Detroit, Michigan, a great city to be from. He received his BS from the University of Michigan, MS from Louisiana State University and the third degree (PhD) from Columbia University after completing a thesis on the tectonic controls on foreland basin stratigraphy. He had a post-doc at the University of Wisconsin (Madison) studying the Michigan Basin.

He returned to Lamont-Doherty Earth Observatory in 1993 and began the Arctic Ocean work that has defined his career. He participated in the first SCICEX cruise to the Arctic Ocean on the US Navy fast attack submarine the USS Pargo in 1993. During the remainder of the SCICEX program, which included five more Arctic Ocean cruises supported by Sturgeon class nuclear powered submarines, he led the geophysics program, which culminated in the installed

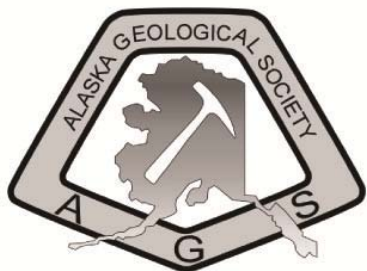
of the SCAMP (Seafloor Characterization and Mapping Pods) on the USS Hawkbill for the 1998 and 1999 cruises. These purpose built sonars enabled interferometric swath mapping and sub-bottom profiling from an underway submarine, revealing previously unimagined details of the seafloor and the sediments below it.

Since the last SCICEX cruise in 1999, the bulk of his research has been conducted from the icebreaker USCGC Healy, sailing across the basin in 2005 and participating in Extended Continental Shelf mapping cruise in 2004 and 2012 (September). He also led one of the first systematic multi-channel seismic reflection surveys conducted in the Arctic Ocean basin in 2011 from the RV Marcus G. Langseth.

For the last ten years Dr. Coakley has been a professor of geophysics at the University of Alaska - Fairbanks.

The Alaska Geological Society offers scholarship awards to graduate and undergraduate students who are conducting geoscience research projects in Alaska

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Updates from 2012 Scholarship Recipients:

Gabrielle Vance:

The Influence of Climate and Tectonics on Topography in the Hayes Range and Its Foothills

My Alaska Geological Society scholarship enabled me to conduct fieldwork in the Anderson Mountain area of the Wood River valley in summer 2012, which provided a valuable perspective of the study area. Currently I am synthesizing satellite imagery, field data, and geologic maps to construct composite maps of mean elevation, lithology, structures, and predominant erosion mechanisms in the Hayes Range study area. I plan to submit my final draft and defend my thesis in spring 2013. I hope that my project will contribute to an emerging understanding of the complex neotectonics of a dynamic and relatively little-studied part of the Alaska Range. Crossing the transition from well-defined Quaternary structures that have not been obscured by glaciation into progressively more glaciated terrain may provide new insight into the complex interactions between tectonics and glaciation in the formation of topography.

Helena Buurman, PhD Candidate, UAF:

Thanks to the generous award that I received from the Alaska Geological Society, I was able to present my PhD research at the Cities on Volcanoes conference in Mexico - an international conference held every 2 years with a focus on volcanic hazards. I gave a talk on my research on volcano seismicity in Alaska - my first talk at a scientific conference! It was a fantastic opportunity to showcase my work to an international group of scientists. I also learned a great deal about how volcanic hazards are dealt with in other countries. Living and studying in Alaska means that travel to conferences like these is usually not affordable for students, so this was a unique opportunity for me to showcase my work and make connections with people at other volcano observatories across the world. As I near the end of my graduate degree, opportunities like these become increasingly valuable because they provide a venue for me to meet future collaborators and potential employers. Thank you, AGS!

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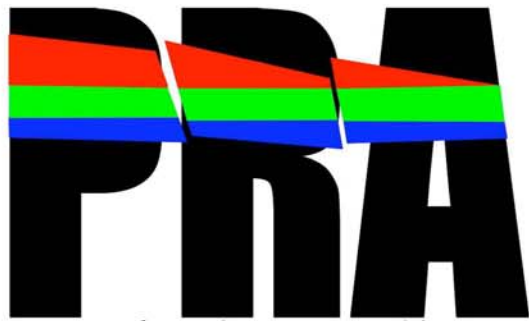
LUNCHEON SCHEDULE 2012 - 2013

Updates on the web at:

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September 2012	Thursday, Sept. 20 th – James R. Markello ExxonMobil Upstream Research Co, Houston, TX; A New Depositional & Sequence Stratigraphic Architecture for the Lisburne Wahoo Reservoir, North Slope Alaska
October 2012	Thursday, Oct. 18 th – Dr. John C Eichelberger, USGS; A 100 Year Perspective of the Katmai Volcano and Eruption
November 2012	Thursday, Nov. 15 th – Dr. Mark Myers, Vice Chancellor for Research, UAF; Geology Research and the Geophysical Institute at University of Alaska Fairbanks
December 2012	Thursday, Dec. 13 th – Ed Duncan, President – Great Bear Petroleum; Unconventional Oil Reservoirs on the North Slope of Alaska
January 2013	Thursday, Jan 17 th – Kristine Crossen, UAA; Tsui Lake Jokulhlaup and the 15 year surge of Bering Glacier, Alaska
*January 2013	<i>TUESDAY</i> , Jan. 22 nd – Dr. Bernard Coakley, UAF; MCS Data Across the Chukchi Borderland and Chukchi Shelf
February 2013	Thursday, Feb. 21 st – Josef Chmielowski, BP Exploration Alaska, Heavy Oil Team Leader, “Heavy Oil Development and Technologies, North Slope, Alaska”
March 2013	March 21 st – David Allard, Apache New Ventures Manager; Cook Inlet Exploration
April 2013	Thursday, April 18 th – Jana DaSilva Lage, Aeromatic, Manager and Geologist, “The Mighty Matanuska: An Aerial Mapping Study”
May 2013	Thursday, May 16 th – Dr. Wesley Wallace, UAF; Neotectonics of a Complex Plate Boundary Zone: Indentation, Rotation, and Escape in Alaska

If you would like to volunteer a talk or would like to suggest a speaker, please contact Monte Mabry at 230-4488.



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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.

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Contact membership coordinator Greg Wilson with changes or updates (e-mail: gregory.c.wilson@conocophillips.com; phone: 907-263-4748)

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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, 907-458-3142.

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 Daniel Yancey, Daniel.yancey@bp.com

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