

News Release

December 12, 2008

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USGS Science at AGU

Climate Change, Floods, Northern Forests, Coral Reefs, Earthquakes, Volcanoes, Mercury and More

Wading through thousands of abstracts at the American Geophysical Union Conference can be a daunting task. In this USGS media tip sheet, we've done a lot of wading for you. Selected and compressed for your convenience, here are some of the newest, most exciting science topics that the USGS will present at AGU. Tips are presented in chronological order with session numbers and a summary.

News media representatives are invited to visit the USGS booth in the AGU Exhibit Hall. Our exhibit highlights Earth observations from space, climate change, and developing a U.S. water census. This is an easy place to connect with USGS data, publications, and information.



The USGS news release "Northern Soil Carbon Reservoirs Vulnerable to Global Warming" will be available December 15th in the AGU press room, by contacting the names above or by visiting www.usgs.gov/newsroom

U.S. Department of the Interior
U.S. Geological Survey



Red River flooding near Grand Forks, North Dakota, 1997

MONDAY, 12/15, 8AM, MC 2003

Flood Flows and Climate Variability in the US, an Exploration of the Literature, Theory, and Long-term Flood Records

Bob Hirsch

H11I-01/Oral Presentation

Recent literature and global climate models suggest that greenhouse-gas induced warming will make extreme precipitation events more common. Prudent emergency preparedness and flood mitigation measures should be based on understanding historic flood records while searching the data for trends related to climate-forced events.

MONDAY, 12/15, 8AM MC HALL D

Regional Shoreline Change Along the North Slope of Alaska

Ann Gibbs

C11C-0521/Poster

The impacts of climate change to the north coast of Alaska threaten sensitive ecosystems, critical energy-related infrastructure, native Alaskans, trust species and their habitats, and large tracts of federally-managed land. The USGS is documenting regional, historical shoreline changes to provide baseline informa-

tion to help evaluate potential effects of sea-level rise and other effects of global climate change on future coastal conditions.

MONDAY, 12/15, 8AM, MC HALL D

Boreal Forest Organic Soil Properties: Variation Across Landscapes

Kristen Manies

B11D-0390/Poster

Alaska is not only a really big state in size, but also in its importance to the global carbon budget. USGS results show that data collected on soil carbon at specific sites can be used to help predict carbon storage across the state. This information is useful for modeling as well as determining where carbon is vulnerable to climate change.

MONDAY, 12/15, 8:30AM, MC 3004

Great Earthquakes and Tsunamis Born in Aleutian Trench

David Scholl

T11D-03/Oral Presentation

The evolving morphologic, structural, and tectonic elements of a subduction zone's submerged forearc points to its past history of having repeatedly discharged giant earthquakes and tsunamis.

MONDAY, 12/15, 9:45AM MC 2024

Microbial Activity and Methylmercury Production in Saltmarsh Sediments of San Francisco Bay, California

Lisamarie Windham-Myers

B11G-08/Oral Presentation

Tidal marshes of varying hydrology and salinity have been shown to have high rates of microbial methylmercury production. Mercury biogeochemistry in northern San Francisco Bay marshes shows that emergent wetland plants directly influence mercury cycling in densely rooted surface soils and are likely to be a primary reason why periodically flooded, high elevation marsh sites are a “hot spot” for mercury methylation.

MONDAY, 12/15, 1:40PM, MC 2022

How Will the San Francisco Bay-Delta Ecosystem Respond to Climate Change and Continued Population Growth?

James Cloern

OS13E-01/Oral Presentation

Programs to ensure sustainability of coastal ecosystems and the biological diversity they harbor require ecological forecasting to assess habitat transformations that include the effects of climate change and projected human population growth. A multidisciplinary Sacramento-San Joaquin Delta and San Francisco Bay modeling project uses climate change scenarios, together with the increasing demand for California’s water resources, to address issues of interest to resource managers.



MONDAY, 12/15, 1:40PM, MC HALL D

Assessing Groundwater Availability Under Competing Demands and Climate Change

Matthew Bachmann

H13G-1015/Poster

Water shortages in the arid American West sometimes pit growing city populations against farmers against endangered species. In the face of growing demand and projected future climate change, USGS scientists have developed a variety of tools for managing scarce water resources. However, even the best management practices are temporary solutions.

MONDAY, 12/15, 1:40 PM MC HALL D

Pliocene Sea Surface Temperature Reconstruction

Harry Dowsett

PP13B-1435/Poster

What would a warmer earth look like? To get clues, scientists are looking at the past. About 3 million years ago, the global mean annual temperature was considerably warmer — about 2-3°C warmer — than it is now. A paleo-environmental reconstruction of sea-surface temperature, alternative land cover, 3-dimensional deep ocean temperature, topography, and sea level, helps scientists model climate.

MONDAY 12/15, 1:40PM, MC HALL D

Atmospheric Mercury Deposition in a Permafrost Core from Northern Alaska

Paul Schuster

B13C-0452/Poster

Permafrost covers a significant amount of the Earth’s land surface. And it is melting at an alarming rate. This change could result in the release of stored carbon, nutrients, and metals into the environment. Of particular concern is the reservoir of the global pollutant mercury that could become bioavailable upon thawing. USGS scientists have

found elevated levels of mercury in a northern Alaska permafrost core and are studying the implications of substantial historically sequestered reservoirs of mercury being released into the environment.

MONDAY, 12/15, 1:40PM, MC HALL D

Yukon River Basin Water Quality Monitoring Partnership Program

Paul Schuster

ED13A-0590/Poster

The USGS and the Yukon River Inter-Tribal Watershed Council, an indigenous grassroots organization consisting of 66 First nations and Tribes, have forged a strong collaboration and partnership to establish a successful water-quality monitoring program for the Yukon River basin, an area twice the size of California. This relationship is adding to a long-term dataset, critical to understanding the effects of climate change on river basins.

MONDAY, 12/15, 3:00PM, MC 3015

Geoscientific Data for the Revitalization of Afghanistan

James F. Devine and others

PRESS CONFERENCE

New data are available that will help support the revitalization and prosperity of Afghanistan. Scientists will report on Afghanistan’s current and future climate scenarios, water availability issues, and significant natural resource potential, including the location and quantity of oil, gas and non-fuel mineral resources. This research will help better define areas for future exploration and development and are important components in creating effective mitigation and adaptation strategies in response to climate change.

TUESDAY, 12/16, 10:20AM, MC 2003

See the full session of talks about USGS science in Afghanistan:

NS22A-02, NS22A-04 & NS22A-05

MONDAY, 12/15, 5:45PM, MC 3008

Ground Motion Simulations of Scenario Earthquake Ruptures of the Hayward Fault

Brad Aagaard

S14B-08/Oral Presentation

The USGS led a collaborative effort to compute ground motions in the San Francisco Bay Area for 35 magnitude 6.7-7.2 scenario earthquake ruptures involving the Hayward fault. The simulations illustrate the dramatic increase in intensity of

shaking for a magnitude 7.0 rupture of the entire Hayward fault compared with a magnitude 6.8 rupture of the southern two-thirds of the fault.

TUESDAY, 12/16, 3:00PM, MC 3015

Abrupt Climate Change

Jack McGeehin and others

PRESS CONFERENCE

The U.S. Climate Change Science Program is releasing its synthesis and assessment report on Abrupt Climate Change. The report explores four types of abrupt climate changes that stand out in the geologic record as being so rapid and large in their impacts that, if they were to recur, they would pose clear risks to society's ability to adapt.

See news release www.usgs.gov/newsroom

TUESDAY, 12/16, 5:18PM, MC 2006

The Great Southern California Shakeout: Earthquake Science for 22 Million People

Lucy Jones

U24A-07

USGS scientists have provided critical information for Southern California residents to improve their resiliency following destructive earthquakes through the Great Southern California ShakeOut earthquake scenario, describing the impacts and consequences of a magnitude 7.8 earthquake on the southern San Andreas Fault. The ShakeOut preparedness drill based on that scenario was the largest in United States history, furthering the goal of making earthquakes a reality that are regularly discussed throughout southern California communities. <http://shakeout.org>



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WEDNESDAY 12/17, 8:00AM, MC HALL D

Do the Corals off Moloka`i, Hawai`i Preserve a Long-term Ground Water Discharge Record?

Nancy Prouty

PP31A-1478/Poster

Ground water provides nearly 100% of the domestic drinking water supply in Hawai`i and any change in the availability may have a strong impact on both communities and the agricultural industry. To assess long-term trends in groundwater storage and recharge, USGS scientists are studying the relationship between ground water and corals to extend ground water discharge records.

WEDNESDAY, 12/17, 11:50AM, MC 3006

Probabilistic Seismic Hazard in the San Francisco Bay Area Based on Seismicity Simulation

Fred Pollitz

S32A-07/Oral Presentation

Recent forecasts of future earthquake activity are typically guided by expert judgment about the past history of earthquakes, which is a difficult and subjective procedure for most faults. Computer simulations involving 1000s of fault patches representing Bay Area faults provide an independent physics-based forecast.

WEDNESDAY, 12/17, 1:40 PM MC HALL D

Extending the Sea Surface Temperature Gradient into the Arctic: Paleoclimate Evidence and Future Climate Implications

Marci Robinson

PP33C-1569/Poster

The most recent geologic interval with surface temperatures similar to those projected for the end of this century occurred about 3 million years ago. Some of the most dramatic effects of a warmer climate are found in the Arctic. Evidence shows a pole-ward transport of heat and an Arctic Ocean that was at least seasonally ice-free with surface temperatures as high as 18° C (64° F).

THURSDAY 12/18, 8AM, MC HALL D

New USGS Volcano Hazards Program Web Site

Dina Venezky

IN41A-1120/Poster

Use the revised USGS Volcano Hazards Web Site to get up-to-date information about volcano hazards in the U.S. The recently launched interactive maps display the most recent volcano statuses along with links to background information such as hazard assessments, fact sheets, web cams, and monitoring data.



THURSDAY, 12/18, 9AM, MC 2003

Monitoring Sediment Flow Following Removal of Oregon's Marmot Dam

Jon Major

H411-05/Oral Presentation

The breaching of Oregon's Marmot Dam in October 2007 allowed the Sandy River to flow freely from Mount Hood to the Columbia River for the first time in nearly 100 years. USGS scientists measuring effects of this found that within one year nearly half of the stored sediment eroded, the sediment transport rate in the newly energized Sandy River increased dramatically, and the river channel below the dam site rose substantially.

THURSDAY, 12/18, 10:20PM, MC 3018

Deep Moonquakes and the Analyses of Tidal Stress

Renee Weber

P42A-01/Oral Presentation

The Moon is the only extra-terrestrial body for which seismic data exists and seismology is one of the few ways to learn about a planet's interior. While the Apollo-era lunar seismic data are now 40 years old, new studies are still able to extract useful information from them.

THURSDAY, 12/18, 12:05 PM, MC 3006

Community Velocity Model for the New Madrid Region, Central U.S.

Leonardo Ramirez Guzman

S42A-08/Oral Presentation

In 1811-1812, a series of three major earthquakes in the New Madrid seismic zone with magnitudes near 7.5 shook the central United States affecting a large regional area. To assist planners, emergency responders, and the public understand and mitigate hazards should there be a repeat of similar events, the USGS is synthesizing the expected ground shaking intensity from large earthquakes in the area.

THURSDAY, 12/18, 1:40PM, MC HALL D

Lava Fountains on Io

Laszlo Keszthelyi

P43A-1388/Poster

Io, a large moon of Jupiter, has actively erupting volcanoes. Fountains of lava provide the least adulterated view of this lava. Recent work shows that the lava is not as hot as was originally thought. A model for the interior of Io that fits both theory and observation is now possible.

FRIDAY, 12/19, 8AM, MC HALL D

Multiple Rainfall Pulses Influence Soil Moisture Dynamics During Long Duration Storms

Dennis Staley

H51D-0849/Poster

Wildfires modify the hydrology of recently burned watersheds and may contribute to the initiation of debris flows. Soil moisture dynamics influence the amount, timing and duration of runoff that may trigger these events. Analyzing the timing of the drying of soil following precipitation assists in the prediction of fire-related debris flows.

FRIDAY, 12/19, 8AM, MC HALL D

Occurrence and Geochemistry of Polonium-210 in Ground Water, Lahontan Valley, Nevada

Ralph Seiler

H51C-0817/Poster

Polonium-210 is a radioactive element found in domestic wells at high concentrations in Lahontan Valley, Nevada. It is carcinogenic and has been found at higher concentrations at only two other places in the US. It is naturally occurring but very rare in water because it normally binds to sediments.

FRIDAY, 12/19, 8AM, MC HALL D

Process-based Reference Conditions: An Alternative Approach for Managed River Systems

Paul Grams

H51A-0787/Poster

A strategy for defining and pursuing ecosystem management objectives in river systems where restoration to pre-disturbance conditions is not feasible will be presented. This information helps resource managers and the public decide how to proceed with river ecosystem restoration goals.

FRIDAY, 12/19, 8AM, MC HALL D

Gas-Pistoning Associated With the 2008 Summit Eruption of Kilauea Volcano, Hawai'i:

Matthew Patrick

V51E-2082/Poster

In March, a small explosive eruption at the summit of Kilauea volcano opened a 35 m-wide vent at Halema'uma'u crater. Elevated seismic tremors with discrete phases of episodic bursts correlate well with other observations, including variations in gas emission and plume vigor. Scientists interpret this behavior as re-

sulting from a gas-piston process, which is providing a unique opportunity to study sustained shallow magmatic processes at Kilauea's summit.

FRIDAY, 12/19, 8AM, MC HALL D

Estimating Post-Fire Debris-Flow Susceptibility through High-Resolution Radar Reflectivity and Tipping-Bucket Gage Rainfall

Maiana Hanshaw

H51D-0850/Poster

Wildfires increase hazardous flash-floods and debris-flows from steep hillsides during intense rainfall. A USGS-NOAA collaboration attempts to limit loss of life in southern California through an early-warning system. While rain gages are point measurements, a mobile radar provides spatially continuous rainfall estimates allowing for comparisons of overall rainfall and individual hillside instruments.

FRIDAY, 12/19, 8AM, MC HALL D

Kilauea Summit Activity During 2007-2008: A Failed Eruption and an Eruption that Should Have Failed

Michael Poland

V51D-2073/Poster

How did the 2008 summit of eruption of Kilauea Volcano occur in the absence of traditional indications of volcanic unrest (like earthquake swarms)? USGS results suggest that unexpected hazardous gas emissions and small eruptions may occur in response to decompression events in a magma reservoir, which adds a new dimension to volcano hazards assessments and mitigation.

FRIDAY, 12/19, 10:50AM, MC 2005

Underwater Microscope Tracks Changes in Bed-Sediment Grain Size to Trace Sand Transport: Results of 30,000 Measurements from Grand Canyon between 2000 and 2008

David Rubin

H52C-03/Oral Presentation

A new underwater microscope tracks movement of sediment on the bed of the Colorado River through the Grand Canyon. When the Paria River introduces sand to the Colorado River, the sand travels downstream relatively quickly (tens of miles in days or weeks). During intervening periods, the river preferentially erodes finer sand grains from the bed causing it to winnow and coarsen. Such observations enable scientists to design and study the impact of high-flow experiments and other attempts to restore the river environment.

FRIDAY, 12/19, 11:05AM, MC 3009

Topographic Change Detection Monitoring Using Terrestrial LiDAR at Archaeological Sites in the Colorado River Corridor of Grand Canyon National Park, Arizona

Brian Collins

G52A-04/Oral Presentation

Archaeological sites within the Colorado River corridor of Grand Canyon National Park are eroding at unknown, but seemingly increasing rates. We now have data to quantify these rates, and to begin to come to conclusions on the causes of archaeological site change.

