KEY EVENTS
American Geophysical Union, Dec. 12-16, 2016
This advisory online with live hyperlinks: http://bit.ly/2gFYiSi

Scientists at Columbia University’s Earth Institute will present important findings at this year’s meeting of the American Geophysical Union, the world’s largest gathering of earth and space scientists. Below, a guide to some key events, in rough chronological order. Unless otherwise noted, scientists are at our Lamont-Doherty Earth Observatory. For abstracts, see the Meeting Program. Reporters may contact scientists directly, or science news editor Kevin Krajick, kkrajick@ei.columbia.edu 917-361-7766.
Follow our AGU blog at http://bit.ly/2ggSO1H.

* * *

Surprising U.S. Drinking-Water Dangers  Maura Allaire, Columbia Water Center
Following revelations that the Flint, Mich., water supply was laced with lead, it became obvious that the nation has no long-term picture of water-supply problems. Allaire has assembled one, examining EPA violations in all 50,000 community systems back to the 1980s. She found some 1,000 violations for excess lead or copper—but sewage-linked bacteria (27,000 violations), and fertilizer-linked nitrate (15,700) are even more prevalent. Known violations are probably only part of the picture, she says.
Monday, Dec. 12, 8:45am-9:00am, 104 Moscone South.   PA11E-04

Water Quality Concerns Beyond Flint

Climate Change, Air Pollution and Health
Patrick Kinney, Mailman School of Public Health
Kinney, an expert on climate and human health, assesses how rising temperatures may create more U.S. air pollution. Ozone, which forms faster in hotter conditions, is projected to climb unless more controls are put on products of combustion. Wildfires will increase as climate warms, and the damaging fine particulates they produce will increase in step. This may in fact already be happening, according to recent measurements in California.
Monday, Dec. 12, 10:50am-11:05am, 2020 Moscone West.   GC12A-03

The Fate of Himalayan Glaciers  Joshua Maurer
The picture of how climate is affecting Himalayan glaciers is blurred, because most studies focus on specific regions and timeframes. Now, Maurer and colleagues have assembled a record of long-term change across wide areas by consistently processing data ranging from declassified 1970s spy-satellite imagery to the latest remote observations. They see widespread dynamic retreat of clean-ice glaciers and down-wasting of debris-covered ones. In particular, glaciers calving into proglacial lakes are undergoing pronounced retreat.
Monday, Dec 12, 1:40pm-6:00pm, Moscone South Posters.   C13D-0869

Vegetation Changes in a Drying Southwest
Justin Mankin, NASA Goddard Institute for Space Studies
Models predict that the U.S. Southwest will dry significantly in coming decades, due to warming, and this appears to already be underway. Most studies have looked only at the
surface effects, but Mankin looks both on and under the ground, from standing vegetation to 3 meters into the soil. Vegetation may become more efficient at drawing up water—but that efficiency may dry out the soil even more.

**Monday, Dec. 12, 5:15pm-5:30pm, 3003 Moscone West. GC14B-06**

**Can We Geoengineer the Mantle? Peter Kelemen**

Most proposed methods for removing carbon from the air require extensive infrastructure and energy. Geochemist Kelemen proposes to harness natural processes in seawater and sub-seafloor mantle rocks to take in vast amounts of carbon, using little of either. The process would pipe carbon-poor water from mantle rocks to the sea surface; rapid reactions would then turn atmospheric carbon to a limestone-like solid that would sink. Kelemen and colleagues are working in Oman to explore the scheme.

**Tuesday, Dec. 13, 9:30am-9:45am, 3003 Moscone West. GC21J-07**

**Story/photo essay on Kelemen’s work in Oman | Turning CO2 to Stone**

**Arctic Report Card 2016**

The Arctic is warming faster than anywhere else, affecting people, wildlife and environment—changes with ramifications for the global economy, weather, sea level and security. The yearly Arctic Report Card brings together the work of 61 scientists from 11 nations to provide the latest on air and sea temperatures, sea ice, snow cover, ocean acidification, the Greenland ice sheet, vegetation, wildlife and the plankton at the base of the marine food chain. The peer-reviewed report is led by the U.S. National Oceanic and Atmospheric Administration. With Jeremy Mathis (NOAA), Jacqueline Richter-Menge (U.S. Army Corps of Engineers) and Marco Tedesco (Lamont-Doherty Earth Observatory).

**PRESS CONFERENCE: Tuesday, Dec. 13, 10:30-11:20am, 3000 Moscone West.**

**The Lamont-Doherty Earth Observatory Party**

Traditionally on Tuesday night, Lamont-Doherty Earth Observatory and Columbia’s Department of Earth and Environmental Sciences gather staff and the many alumni now at other institutions worldwide. Journalists covering AGU are welcome—a great chance to make friends, hear informally about new work and have fun.

**Tuesday Dec 13, 6:30pm-8:30pm (or beyond), San Francisco Marriott Union Square, 480 Sutter Street, Union Square Ballroom - Mezzanine**

**Too Hot to Work Timothy Foreman Ph.D. Program in Sustainable Development**

Warming climate is projected to heighten vector-borne diseases, human mortality and civil conflict. Foreman looks at another potential problem: worker productivity, which he says may drop sharply in countries that are already hot and humid. His behavior study in Mexico, Guatemala and Nicaragua finds that a 1-degree C increase reduces each worker’s output up to an hour a day. The effect is strongest in the poorest, hottest places.

**Wednesday, Dec. 14, 8:00am-12:20pm, Moscone South Posters. PA31B-2202**

**Future El Niño Mark Cane**

Cane, who co-created the first working predictive model of the Niño-Southern Oscillation, will address the big questions still surrounding the world’s most powerful weather maker. In 1986, there was only one model; now there are 40, but forecasting still often falls short. Why is ENSO still so unpredictable? Do we even know how potentially predictable it is? And what will become of it in the next century, as background temperatures warm?

**Wednesday, Dec. 14, 1:40pm-1:55pm, 3006 Moscone West. A33N-01**

**Greenland’s Glacial Earthquakes Are Booming Kira Olsen**
In Greenland, earthquakes generated by icebergs calving off marine glaciers are multiplying fast. From 1993-2010, 305 events were recorded. 2011-2013 saw 145 more, boosting the earthquake catalog by nearly half. Seismicity has risen especially in western Greenland, and activity has started up in at least one previously quiescent glacier. Such marine fronts now account for half of Greenland’s yearly ice loss.

**Wednesday, Dec 14, 1:40pm-6:00pm, Moscone South Posters.  C33C-0839**  
**Glacial quakes may help forecast sea level / Quakes point to rising temperatures**

**Taking the Pulse of the Mid-Ocean Ridges**  
**Maya Tolstoy**
In this year’s Birch Lecture, marine geophysicist Tolstoy discusses recent surprising findings about the mid-ocean ridges. They are generally viewed as churning out seafloor at a steady rate, but evidence now suggests their activity may wax and wane over a wide variety of time scales, due to factors including orbital cycles and changing sea level. If seafloor spreading is not steady, geochemical cycles including the carbon cycle probably are not, either.

**Wednesday, Dec. 14, 4:15pm-5:00pm, 104 Moscone South.  T34A-01**

**Systematic Groundwater Changes Linked to Fracking**  
**Beizhan Yan**
In the first broad study of its kind, Yan and colleagues have shown consistent changes in groundwater chemistry near hydraulic fracturing wells in Pennsylvania. Common substances are found at higher levels, including calcium, chlorine and sulfates—possible harbingers of more dangerous changes to come. Yan gives an update on data from this area, and how water quality compares with that in adjacent New York, where fracking is banned.

**Wednesday, Dec. 14, 4:45pm-5:00pm, 3014 Moscone West.  HC34C-04**  
**Study Links Groundwater Changes to Fracking**

**Southern Pine Beetles Heading North**  
**Radley Horton, Center for Climate Systems Research**
In coming decades, warmer winters are expected to allow the northward spread of many cold-limited insects, including the destructive southern pine beetle, already making inroads in New Jersey, New York, Connecticut and Massachusetts. Horton presents the first projections of future spread, which he says will be rapid. He predicts that by midcentury, the beetles will be in vast, previously unaffected forests across the northeastern U.S. and southeastern Canada. Effects could include threats to the timber industry and biodiversity.

**Wednesday, Dec. 14, 5:00pm-5:15pm, 3012 Moscone West.  GC34A-05**

**Understanding Giant Landslides With Seismology**  
**Lucia Gualtieri**
Lamont seismologists can now detect landslides in real time by the seismic waves they produce. Gualtieri looks at North America’s largest since the collapse of Mt. St Helens: an October 2015 slide at Icy Bay, Alaska, when some 150 million tons of rock slid into a remote fjord. No one died, but it created a 600-foot-high tsunami and remade the landscape. Seismology is shedding light on the dynamics of slides and slide hazards.

**Wednesday, Dec. 14, 5:30pm-5:45pm, 306 Moscone West.  NH34B-07**  
**The Icy Bay landslide / Icy Bay and other Alaska landslides**

**Newly Found Meltwater Rivers in Antarctica**  
**Jonathan Kingslake, Robin Bell**
Surface meltwater streams have helped lead to the shocking collapses of ice shelves on the Antarctic Peninsula. Up to now, such streams have been thought to exist mainly within the peninsula’s ice shelves, in the northernmost, warmest part of Antarctica. But new satellite imagery and field observations show they are widespread, with drainages snaking through landbound ice to within a few hundred miles of the South Pole, where this was thought to be
impossible. Kingslake discusses what drives them. He predicts streams will soon proliferate if the continent warms, possibly leading to unexpectedly fast ice disintegration.

**Volcanoes: Coming to New England?**  William Menke  
Some 30 years ago, geophysicists detected a 400-kilometer-wide anomaly under parts of New England and eastern New York, where the mantle is unusually hot. It was assumed to be the remnant of a hot spot that moved on some 130 million years ago. Now, based on new seismic images and signs of helium making its way up to lakebeds, Menke says the feature is an active upwelling--hot and shallow enough to create lava. Similar features may underlie other parts of the East Coast.

**Friday, Dec. 16, 5:15pm-5:30pm, 3007 Moscone West.  C54A-06**

**Films From the Field**  
Lamont-Doherty scientists gather data on every continent and every ocean. Short films on some projects will be shown at the AGU Cinema; others can be viewed online. Some of the most recent:

**Between the Trees and the Tundra**  In northern Alaska, a team studies trees at the edge of their range, and how they may respond to climate change.

**Quizapu, a Great Chilean Volcano**  An expedition to study the blasted, remote terrain that is the source of some of South America's biggest eruptions.

**Seeking Humanity's Roots**  A journey to the desert of northwest Kenya, where scientists are finding the oldest known human remains and artifacts.

**At Sea With the R/V Marcus G. Langseth**  The United States’ flagship vessel for seismic exploration is opening new vistas into the deep structure of the seabed.

**The Largest Mass Poisoning in History**  Scientists investigate how arsenic has seeped into the drinking water of millions of Bangladeshis, causing a public-health catastrophe.

**AGU Cinema: Short Films on Science.  101 Moscone South.  Monday-Wednesday, 8am-3:30 pm.  Thursday, 8am-6pm.  Friday 8am-noon.**

---

**The Earth Institute, Columbia University,**  mobilizes the sciences, education and public policy to achieve a sustainable earth. Members and affiliates represented here:

**Lamont-Doherty Earth Observatory**  seeks fundamental knowledge about the origin, evolution and future of the natural world. Its scientists study the planet from its deepest interior to the outer reaches of its atmosphere, on every continent and in every ocean.

The **Center for Climate Systems Research**  enhances interdisciplinary earth and climate-systems research at Columbia and the affiliated NASA/Goddard Institute for Space Studies.

**Mailman School of Public Health**  is at the forefront of public health research, education and community collaboration. It tackles pressing issues, translating research into action.

The **Columbia Water Center**  addresses the issue of freshwater scarcity through innovations in technology, public policy and private action on local, regional and global levels.

The Earth Institute's **Ph.D. Program in Sustainable Development**  combines a traditional graduate education in social sciences with natural sciences and engineering.

**NASA Goddard Institute for Space Studies**  is a research center that models and monitors earth systems, to predict atmospheric and climate changes.