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AGU Statement: Investigation of Scientists and Officials in L'Aquila, Italy, Is Unfounded

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Seven Italian scientists and government officials are under investigation on charges of manslaughter for failure to warn the city of L'Aquila, Italy, before an earthquake hit last year, killing hundreds. The six seismologists and one government official under investigation, who are employees of the National Institute for Geophysics and Volcanology (INGV) and the Civil Protection Department, took part in a meeting of the Major Risks Committee on 31 March 2009. At the meeting, the committee told L'Aquila city officials that "just because a small series of quakes has been observed [in L'Aquila] there is no reason to suggest that the sequence of low-magnitude tremors are a precursor to a major event," which was deemed "improbable, although not impossible." However, on 6 April 2009, the city was struck by a M_w 6.3 earthquake that killed 308 people.

The criminal charges against these scientists and officials are unfounded. Despite decades of scientific research in Italy and in the rest of the world, it is not yet possible to accurately and consistently predict the timing, location, and magnitude of earthquakes before they occur. It is thus incorrect to assume that the L'Aquila earthquake should have been predicted. The charges

may also harm international efforts to understand natural disasters and mitigate associated risk, because risk of litigation will discourage scientists and officials from advising their government or even working in the field of seismology and seismic risk assessment.

Science is making critical contributions to the understanding and mitigation of earthquake hazards in Italy and the world. Examples include providing tools such as seismic risk maps to determine areas of greatest vulnerability, improving seismic wave analysis so that we can better understand how the Earth moves during an earthquake, and increasing our capabilities for seismic monitoring and for providing rapid information on earthquake location and severity for early warning systems and first responders.

It is in the best interest of all countries to reduce earthquake vulnerability through awareness, preparation, and mitigation. Local government officials should work with scientists and engineers to prepare for seismic hazards in that region. To truly mitigate earthquake risk, governments must utilize the long-term hazard assessment, post-earthquake Shake Maps, and other tools created by seismologists to educate residents and inform sound infrastructure policy. Communities can increase their earthquake preparedness through implementation of

About AGU Statement

AGU occasionally releases statements on relevant science policy issues that affect our members. The purpose of these statements is to support the global community of Earth and space scientists by providing relevant information to members, policy makers, and the public. We encourage our members to share and discuss this information with others as one way to engage in science outreach and expand scientific discourse. Statements are written with collaboration between AGU member experts along with AGU leadership and staff. Seismologists who work internationally participated in the writing of the accompanying statement. Comments are welcome.

—ELIZABETH LANDAU, Public Affairs Manager, AGU; E-mail: elandau@agu.org

building codes based on these long-term hazard assessments, retrofitting older buildings, improving emergency response, and increasing public awareness of the hazard and individual responsibility during and after these tragic events.

In support of the Italian scientists and officials, the INGV has written an open letter to the President of the Republic of Italy. The letter was open for public signatures and has 5,165 signatories from around the world, many of whom are geoscientists. Please pass this information on to your colleagues if you support these seven scientists and officials and their right to conduct best scientific practices without risk of persecution.

Outstanding Student Paper Awards

The following members received Outstanding Student Paper Awards at the 2009 AGU Fall Meeting, in San Francisco, Calif. See also "Outstanding Student Paper Awards" published previously (Eos, 91(26), 233) and in future issues of Eos.

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Geomagnetism and Paleomagnetism (GP)

Kaori Tsukui, University of New Hampshire, Durham, and Columbia University, Palisades, N. Y., *Paleomagnetism of Eocene tuffs from Laramide foreland basins: Implications for the geomagnetic polarity time scale*

Chuang Xuan, University of Florida, Gainesville, *MATLAB software for viewing and processing u-channel and discrete sample paleomagnetic data: UPmag and DPMag*

Hydrology (H)

Taimoor Akhtar, Cornell University, Ithaca, N. Y., *Multi-objective optimization with function approximation including application to computationally expensive groundwater remediation design*

Khalid Al Bloushi, Missouri University of Science and Technology, Rolla, *Investigating the source of thermal anomalies in the northern*

United Arab Emirates (UAE) desert using geophysical methods

Karli Anderson, University of California, Irvine, *Improving an InSAR and GPS constrained land subsidence model with GRACE data*

Julia Angstmann, University of Wyoming, Laramie, *Drivers of variability in tree transpiration in a boreal black spruce forest chronosequence*

Jazmin E. Aravena, University of Nevada, Reno, *Effect of aggregates compaction in soil hydraulic properties, due to root growth*

Stacey Archfield, Massachusetts-Rhode Island Water Science Center, U.S. Geological Survey, Northborough, Mass., *Rainfall-runoff model calibration at an ungauged catchment using the map-correlation method*

Laura Bazzetta, Carleton College, Northfield, Minn., *Linking river morphology to larval drift of an endangered sturgeon*

Sarah Beatty, McMaster University, Hamilton, Ontario, Canada, *Fractional wetting and contact angle dynamics in water repellent soils*

Ali Behrang, University of California, Irvine, *Evaluation of satellite-based high resolution precipitation products for catchment hydrologic forecasting*

Aditi Bhaskar, University of Maryland Baltimore County, Baltimore, *Urban watershed modeling across landscape scales*

Erin Bray, University of California, Santa Barbara, *Historical runoff prediction in ungauged basins: Monte Carlo simulation of rainfall-runoff relationships in the 19th century northeastern U.S.*

Jeremy Bril, University of Iowa, Iowa City, *The impact of extreme flooding on mussel and microbial nutrient dynamics at the water-sediment interface*

K. S. Chin, Simon Fraser University, Burnaby, British Columbia, Canada, *The spatial distribution of surface soil moisture in a small forested watershed in British Columbia, Canada*

Abbey E. Chrystal, Los Alamos National Laboratory, Los Alamos, N. M., *Isotopic composition of natural nitrate in groundwater in Los Alamos, New Mexico, USA*

Kristin Clark, University of California, Santa Barbara, *Remediation of hydrophobic, persistent pollutants using a magnetic permanently confined micelle array (Mag-PCMA)*

Antoine Espinet, Cornell University, Ithaca, N. Y., *CO₂ plume estimation with automatic calibration of TOUGH model for carbon sequestration in geological formations*

April Gillens, North Carolina Agricultural and Technical State University, Greensboro, *Environmental impacts on nuclear reprocessing solvents*

Khara Grieger, Technical University of Denmark, Lyngby, *Environmental benefits and risks of*

LETTERS

Comment on “AGU Statement: Investigation of Scientists and Officials in L’Aquila, Italy, Is Unfounded”

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In regard to the recent statement by AGU defending our Italian colleagues’ statement on earthquake predictions (*Eos*, 91(28), 248, 13 July 2010), it is my view that there is something more positive that AGU might do than just defend our colleagues. The fundamental problem is that we cannot, with any reasonable certainty, predict earthquakes. This problem applies to many other areas as well. It follows that any statements scientists make should be moderated by that simple fact.

A statement that, to me, is justified is, “I do not know and cannot reliably predict such events for a specific time of occurrence.” This seems to me to be an honest statement. The “prediction” that a significant earthquake would have only a low probability of occurring in regions with frequent

tremors or in a tectonically active region is neither prudent nor justified. The more careful approach is also applicable to “predicting” the occurrence of hurricanes and tornados. In these cases we know the circumstances and seasons when they occur but can make only reasonable predictions after we establish the possible trajectory and degree of an observed disturbance.

This is also a problem in “predicting” global climate change regimes. The scientific community has clear evidence of alteration of our global atmosphere and oceans resulting from human activity. We have models of the processes that appear to have caused them and have inferred the global changes. Because of the extreme magnitude of the possible effects, these considerations and actions must be given serious consideration by all levels of government (nationally and internationally). However, we do not have

the knowledge or power to make explicit predictions. As philosopher Alfred Korzybski once stated, “the map is not the territory”; the “map” is what we think resembles reality, and we should use it as a guide in our thinking and actions. One is well advised, when traveling to a new territory, to take a good map and then to check the map with the actual territory during the journey. This map must be subject to new objective scientific insights with due consideration of the potential imminence of the global changes. Our actions should reflect this viewpoint.

AGU would do a considerable public service if it established a panel to lay out reasonable rules of response to the question of hazards, both immediate and potential. This would be useful as a guide for scientists in reports to the general community. The matter is a complex one, but it is possible to lay out simple guidelines. Certainly in the case of earthquakes, the basic matter of properly designed structures and the enforcement of adequate building requirements is key to most matters. In all cases, the deep question is the social/political one: How can human societies rationally prepare for and respond to real, potential, or imminent disasters?

—G. J. WASSERBURG, Professor emeritus, California Institute of Technology, Pasadena; and Florence, Oregon; E-mail: gjw@gps.caltech.edu

Further Comment on “AGU Statement: Investigation of Scientists and Officials in L’Aquila, Italy, Is Unfounded”

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The AGU statement on the investigation of Italian scientists and officials in regard to the L’Aquila earthquake (*Eos*, 91(28), 248, 13 July 2010) appears to be a noble attempt to protect not only these individuals but also those AGU members who are involved in similar hazard and risk assessments. But in the long run this statement not only damages AGU by misleading its membership as to the responsibilities of the indicted individuals but also sends the wrong message to the Italian scientific communities about their social responsibilities.

The AGU statement assumes that the indicted individuals are innocent because it is not possible for scientists to predict earthquakes, but it neglects to explain what

their scientific responsibilities are and why these individuals may be also guilty of failing to properly exercise their social responsibility. If one accepts public funds, has the responsibility of deciding how to manage those funds, and is playing the double role of a scientist and a politician, one is also responsible for both the scientific and social consequences of one’s actions. Because some of the indicted individuals are also responsible for drafting and promoting the unreliable Vesuvius Evacuation Plan (<http://www.westnet.com/~dobran>), they should also be accountable for the consequences in the Vesuvius area.

If, with AGU’s help, the commission (Commissione Grandi Rischi) consisting of the indicted individuals is acquitted of any wrongdoing in L’Aquila, this will have long-lasting repercussions for volcanic and

seismic risk management in Italy and elsewhere. This is because some of the indicted individuals control much of the Italian research resources in geosciences, and, if acquitted, they and others will be justified in promoting their flawed volcanic, seismic, and other risk management strategies. The independent thinkers wishing to develop and promote better strategies will not be able to secure academic and research positions in their native country and will be forced to go abroad to maintain their freedom of expression.

The AGU statement invites AGU members to support it, but I see serious flaws in involving a scientific organization in judicial business. It is the job of Italian prosecutors, judges, and a jury to determine the appropriateness of the actions of the indicted individuals. My full reply to the AGU statement can be found at <http://www.westnet.com/~dobran/asureply.html>.

—FLAVIO DOBRAN, Global Volcanic and Environmental Systems Simulation (GVES), Naples, Italy; and Hofstra University, Hempstead, N. Y.; E-mail: dobran@westnet.com

Reply to Comments on “AGU Statement: Investigation of Scientists and Officials in L’Aquila, Italy, Is Unfounded”

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It is critical to recognize the benefits and limitations of scientific knowledge, particularly when it comes to predicting hazards. I agree with G. J. Wasserburg that AGU should help scientists communicate their work accurately and understandably so it can provide the greatest value to society. This objective is explicit in AGU’s new strategic plan

(http://www.agu.org/about/strategic_plan.shtml) and is consistent with our vision of both advancing and communicating Earth and space science to ensure a sustainable future.

We as a community have an obligation to increase the role of science in informing policy to mitigate the impacts of natural disasters. Such efforts require an open exchange of ideas and information and a clear

understanding of the limitations of our knowledge. In response to Flavio Dobran, I agree that scientists are not above the law and, like all citizens, must be held accountable for their actions. However, laws and lawmakers must also recognize what science can and cannot do. We cannot yet reliably predict precisely when earthquakes will occur.

It is a tragedy that so many lives were lost in the earthquake at L’Aquila. However, expecting scientists to do the impossible, and then charging them with manslaughter when disaster strikes, is not the way to protect life and property in the future.

—MICHAEL MCPHADEN, President, AGU; E-mail: president@agu.org

ABOUT AGU

Inaugural Science and Policy Union Lecture to Be Given by John Holdren at Fall Meeting

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For the first time, the AGU Fall Meeting will include a Science and Policy Union Lecture, which will focus on the role that science and scientists play in policy.

The inaugural lecture will be given by John Holdren, who is the assistant to the president for science and technology, cochair of the President’s Council of

Advisors on Science and Technology, and director, Office of Science and Technology Policy (OSTP), Executive Office of the President. The title of Holdren’s presentation is “Scientists, Science Advice, and Science Policy in the Obama Administration.”

Holdren holds degrees in aerospace engineering and theoretical plasma physics from Massachusetts Institute of Technology and Stanford University. Before his position

at OSTP, Holdren was a professor in both the Kennedy School of Government and the Department of Earth and Planetary Sciences at Harvard University, and a director of the independent, nonprofit Woods Hole Research Center. He is also a member of the National Academy of Sciences, the National Academy of Engineering, the American Academy of Arts and Sciences, and the Council on Foreign Relations, and a foreign member of The Royal Society, in London. Holdren was president of the American Association for the Advancement of Science in 2006.

The lecture will be held at 12:30–1:30 P.M. on Monday, 13 December, in the San Francisco Marriott Marquis Hotel.

—ELIZABETH LANDAU, Public Affairs Manager, AGU; E-mail: elandau@agu.org

AGU Members Visit Capitol Hill to Promote Earth and Space Sciences

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Climate change, earthquake preparedness, rare earth elements, hydraulic fracking, and America’s global competitiveness in science are among the science topics in policy headlines today. For legislators to create good policy on these and other topics related to the Earth and space sciences, they need access to good science, which is why AGU encourages its members to participate in Congressional Visits Days.

On 21–22 September, 55 Earth and space scientists from 24 states brought their expertise to the U.S. Congress, in Washington, D. C., for the third annual Geosciences Congressional Visits Day (Geo-CVD). AGU partnered with four other geosciences societies to bring a large scientific presence to Capitol Hill.

The event began unofficially with a celebration of the U.S. Geological Survey (USGS), hosted by the USGS Coalition, a

group of scientific societies and organizations, including AGU, that support the USGS. Geo-CVD participants attended the coalition’s annual reception on Capitol Hill, where they mingled with senior USGS leaders, representatives of various national science organizations, and congressional staff members. At the reception, the coalition honored U.S. Rep. Jim Moran (D-Va.), chair of the House Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies, and Rep. Mike Simpson (R-Idaho), ranking member of the subcommittee, with its annual leadership award for their strong support of the USGS.

Geo-CVD began officially the following afternoon with a participant workshop. Attendees learned how to communicate science to legislators and received a breakdown of the fiscal year 2011 federal agency budgets to prepare them for their day on Capitol Hill. The workshop also included a discussion with former congressional

science fellows, Ph.D. Earth and space scientists who have worked as staffers either in a congressional office or on a congressional committee.

Now prepared to advocate for science to Congress, Geo-CVD participants burst onto the Hill later that day promoting the message that steady federal budget support for scientific research and development—and for science, technology, engineering, and mathematics (STEM) education—promotes long-term economic growth, creates lasting jobs, and makes America competitive in the global marketplace, an especially compelling message in the current economy.

Scientists met with the legislative staff of their senators and representatives, and many scientists were fortunate enough to speak directly with members of Congress. Notably, AGU members met with Sens. Lisa Murkowski (R-Alaska) and Mark Udall (D-Colo.) and with Reps. Jason Altmire (D-Pa.) and Jo Bonner (R-Ala.). Geo-CVD participants also met with various committee staff in the House and Senate to discuss scientific research as it relates to the committees’ activities. The scientists walked