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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 $M_{\mu\nu}$ 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, postearthquake 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 Behrangi, 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 un*gauged 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 zero-valent iron nanoparticles (nZVI): Risk mitigation or trade-off?

Maite Guariola-Claramonte, University of Arizona, Tucson, Regional vegetation die-off alters hydrological partitioning

Hugo A. Gutiérrez-Jurado, New Mexico Institute of Mining and Technology, Socorro, On the observed ecohydrologic dynamics of a semiarid catchment with topographic induced microclimatic controls

Alexander Gysi, University of Iceland, Reykjavik, Low temperature CO_2 mineralization into basalt: Solution chemistry and secondary mineral assemblages

Claus Haslauer, University of Stuttgart, Stuttgart, Germany, Effects of non-Gaussian spatial dependence of hydraulic conductivity on hydrodynamic macrodispersion

Andrew Jew, Stanford University, Stanford, Calif., Evidence for multiple export pathways of mercury from the inoperative New Idria Hg Mine, CA

Birendra Jha, Massachusetts Institute of Technology, Cambridge, Numerical simulation of mixing in viscous-fingering displacements

Marie Johnston, University of Wisconsin– Madison, Does vegetation type matter? Plant-soil interactions change urban rain garden hydrology

Juliette Juillerat, University of Vermont, Burlington, Mercury deposition through litterfall and subsequent accumulation in soils: Influence of forest community type

Christa Kelleher, Pennsylvania State University, State College, Understanding the spatiotemporal variability of stream temperature across Pennsylvania

Sadiq Ibrahim Khan, University of Oklahoma, Norman, Satellite remote sensing and hydrological modeling for flood inundation mapping in Lake Victoria Basin: Implications for hydrologic prediction in ungauged basins

Garth Lindner, University of Maryland Baltimore County, Baltimore, *Urban infrastructure and longitudinal stream profiles*

Evan Lyons, University of California, Los Angeles, Seasonal and interannual lake dynamics and shoreline development on the Arctic coastal plain of Alaska

Andrea Munoz-Hernandez, City University of New York, New York, Water scarcity in the northeast corridor during the nineteenth century and its correlation to infrastructure development

Daniel Nadeau, École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland, Large-eddy simulations of the convective atmospheric boundary layer over heterogeneous land surfaces **Mark Parrish**, Portland State University, Portland, Oreg., *A new approach in multi-model hydrologic forecasting: Merging the data assimilation with Bayesian model averaging*

Emily Peters, University of Minnesota, Saint Paul, *Environmental and biological controls of ur*ban tree transpiration in the upper Midwest

Kara Schlichting, Rutgers University, New Brunswick, N. J., Nineteenth century harbors: Accounting for coastal urban development in hydrologic change

Michael Szulczewski, Massachusetts Institute of Technology, Cambridge, Suppression of mixing in miscible viscous fingering in a Hele-Shaw cell

Adam Ward, Pennsylvania State University, University Park, *Imaging hyporheic zone solute* transport using electrical resistivity

Karen Williams, Montana State University, Bozeman, *Hillslopes to hollows to first order channels: Identification of transitions and characteristics of process domains in headwater catchments*

Jay P. Zarnetske, Oregon State University, Corvallis, Labile dissolved organic carbon availability controls hyporheic denitrification: A ¹⁵N tracer study

Ke Zhang, University of Montana, Polson, Satellite-based global long-term terrestrial evapotranspiration estimates and trend analysis

Mineral and Rock Physics (MRP)

Amanda Dillman, University of Minnesota, Minneapolis, *The effect of cation charge and size* on grain boundary diffusion creep of synthetic forsterite

Zhicheng Jing, Yale University, New Haven, Conn., and University of Chicago, Chicago, Ill., *A* new approach to the equation of state of silicate melts: An application of a hard-sphere model to a multi-component system

Christine McCarthy, University of Tokyo, Tokyo, Japan, *Experimentally determined attenuation and modulus in Earth analogue materials over a wide range of frequency*

Maribel Nunez Valdez, University of Minnesota, Minneapolis, Fundamentals of elasticity for Fe-bearing forsterite

Natural Hazards

Kate Brodie, Virginia Institute of Marine Science, Gloucester Point, *Measuring bathymetry*, *runup*, and beach volume change during storms: New methodology quantifies substantial changes in cross-shore sediment flux Isaac J. Larsen, University of Washington, Seattle, Material matters in landslide volume-area scaling

Tina Swierczynski, German Research Centre for Geosciences, Potsdam, Germany, A 2000 year flood record from annually laminated sediments of Lake Mondsee (European Alps, Upper Austria)

Nonlinear Geophysics (NG)

Auguste Gires, Université Paris-Est, Créteil Val de Marne, France, *The interplay between* zero-rainfall and multifractal estimates of the extremes: A weighed analysis

Alexander Pui, University of New South Wales, Sydney, Australia, *How does the Interdecadal Pacific Oscillation affect design floods in Australia?*

Ellen Webb, University of Nevada, Reno, *Tokunaga trees: Why do they emerge everywhere?*

Ocean Sciences (OS)

Bo He, University of Chicago, Chicago, Ill., *Evaluation of the diagenetic role of iron as a sulfide buffer at Cape Lookout Bight, North Carolina (USA)*

P. K. Kannberg, Oregon State University, Corvallis, Heat flow and gas hydrates on the continental margin of India: Building on results from NGHP expedition 01

Lieven Naudts, Ghent University, Ghent, Belgium, Newly collected multibeam swath bathymetry data herald a new phase in gas-hydrate research on Lake Baikal

Emily C. Pope, Stanford University, Stanford, Calif., *Iceland Deep Drilling Project (IDDP): (3) Oxygen and hydrogen stable isotope composition of a rhyolite magma*, *Krafla geothermal system*

Jacob Siegel, Rice University, Houston, Tex., Geophysical profiling of the New England continental shelf: Insights to depositional history, glaciations, and subseafloor freshwater

H. C. Ver Eecke, University of Massachusetts, Amherst, Modeling the growth of hyperthermophiles in deep-sea hydrothermal diffuse fluids and sulfide deposits

Nicolas Waldmann, University of Bergen, Bergen, Norway, *Gas hydrates on the mid-Norwegian continental margin: Pacemakers of slope stability through time*

Min Xu, Woods Hole Oceanographic Institution, Woods Hole, Mass., *Seismic waveform modeling of the reflection response from a mid-ocean ridge axial melt sill: Understanding the message behind the polarity of waves reflected off the melt lens*