

## LETTERS

edited by Jennifer Sills

### L'Aquila's Aftershocks Shake Scientists

I HAVE BEEN SENTENCED TO 6 YEARS OF IMPRISONMENT FOR FAILING TO GIVE ADEQUATE advance warning to the population of L'Aquila, a city in the Abruzzo region of Italy, about the risk of the 6 April 2009 earthquake that led to 309 deaths. I have been found guilty despite illogical charges and accusations that set dangerous precedents for the future of the scientific process.

The judge's ruling claims that citizens of L'Aquila would normally rush outside upon feeling an earth tremor, but that they did not in 2009 because a Major Risks Commission (CGR) meeting in L'Aquila, one week beforehand, had given them a false sense of security. However, this meeting was run, not by the National Institute of Geophysics and Volcanology (INGV), but by an arm of the Prime Minister's office: the Civil Protection Agency (CPA). An agreement between the INGV and the CPA states that the latter is exclusively responsible for communicating any state of risk. The INGV has always scrupulously adhered to that regulation. As a former president of the INGV, I never spoke to the media about the seismic situation at L'Aquila, and no relative of the victims suggested otherwise.

Rather, the "proof" used by the public prosecutor was the CGR meeting minutes. At that meeting, I (and others) stated that Abruzzo, and particularly L'Aquila, is one of the worst earthquake zones in Italy. I then explained that earthquakes are not predictable for good scientific reasons and discussed some of the seismic mechanics involved. The Mayor of L'Aquila, Massimo Cialente, testified that he was struck by my statement about the local seismic risk at this meeting, and as a result he decided to close certain schools and recommend a state of emergency be declared.

At the CGR meeting, we also distributed the Seismic Hazard Map, made official in 2003 (1), which was largely the work of the INGV under my presidency. The map clearly shows Abruzzo as a hazardous zone. One of its goals was to inform administrators of what action to take to reduce seismic risk in the areas they governed. The maps were later

made available to the public prosecutor, who ignored them just as he ignored the testimony of Mayor Cialente.

As further evidence of my guilt, the public prosecutor completely distorted the argument of one of my journal publications (2), effectively putting science itself on trial. In that 1995 work, my colleagues and I highlighted

the statistical importance of temporal "clustering": various strong earthquakes in a (geologically) brief time span. We posited that the high probability rate calculated for the Aquilan territory is not statistically meaningful because it is based on three events that occurred between the 17th and 18th centuries—hardly a sufficient basis to describe what would happen in subsequent centuries.

The public prosecutor's superficial interpretation of scientific results to bolster his argument sets a grave precedent for not only seismology but many other disciplines as well. Science is constantly evolving; research proceeds by trial and—as knowledge grows—error. When I wrote the "indicted" work, I was addressing my worldwide peers and awaiting their verification, as must be the way of all modern scientific research.

In publishing an official map, seismologists have done all they currently can to protect society from earthquakes. I can hardly be blamed for the poor quality of buildings or for people's failure to conform to anti-seismic laws—these are the responsibilities of other authorities. The local CPA is responsible for accurate communication of risk and effective management of emergency situations. I did not disseminate false or imprudent information. My question is: What could I do to avoid conviction? I suppose I should have foreseen the earthquake!

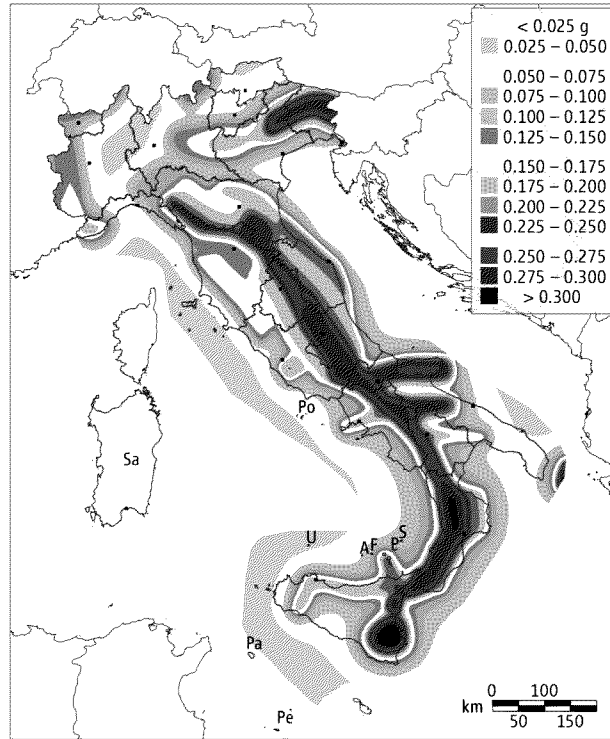
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#### References and Notes

1. M. Stucchi *et al.*, *Bull. Seismol. Soc. Am.* **101**, 1885 (2011).
2. E. Boschi, P. Gasperini, F. Mulargia, *Bull. Seismol. Soc. Am.* **85**, 1475 (1995).
3. I want to express my strong friendship to Giulio Selvaggi, who was also wrongly accused in the L'Aquila trial.





CREDIT: INGV

Seismic Hazard Map distributed by the National Institute of Geophysics and Volcanology.

