

New twists in Italian seismology trial

Californian scientist testifies against defendants in quake manslaughter case.

Nicola Nosengo

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The courthouse in L'Aquila, Italy, yesterday hosted a highly anticipated hearing in the trial of six seismologists and one government official indicted for manslaughter over their reassurances to the public ahead of a deadly earthquake in 2009 (see ['Scientists face trial over earthquake deaths'](#) and ['Scientists on trial: At fault?'](#)). During the hearing, the former head of the Italian Department of Civil Protection turned from key witness into defendant, and a seismologist from California criticized Italy's top earthquake experts.

All those indicted took part in a meeting held in L'Aquila on 30 March 2009, during which they were asked to assess the risk of a major earthquake in view of the many shocks that had hit the city in the previous months. After the meeting, Bernardo De Bernardinis, deputy head of the Department of Civil Protection, said to the press: "The scientific community tells me there is no danger because there is an ongoing discharge of energy," a statement that most seismologists consider to be scientifically incorrect. On 6 April 2009, a magnitude-6.3 quake hit the city, killing 309 people. De Bernardinis and the six members of the scientific panel have been indicted for manslaughter because their false reassurances prompted many people not to evacuate.

Guido Bertolaso, former head of the Department of Civil Protection and De Bernardinis's direct superior, had not been indicted and was originally expected to appear as a witness. But a few weeks ago a [wiretap revealed](#) that he had apparently set up the meeting to convey a reassuring message, regardless of the scientists' opinion. He also seemed to be the source of the "discharge of energy" statement. He thus found himself under investigation and, at the beginning of the hearing, he was officially notified that he too may soon be formally indicted for manslaughter.

Bertolaso was asked by the prosecutor to explain that telephone conversation. He defended himself by saying that by defining the meeting as a "media move", he was not trying to downplay risks but rather to put some order into the contradictory information that was reaching the citizens in those days. In particular, he referred to Giampaolo Giuliani — a laboratory technician and amateur seismologist who was alarming the population with claims that a major shock was coming — and to a newspaper article that had misquoted some Civil Protection experts and stated that the shocks would soon be over. The meeting, he said, was meant to make clear that both were wrong and that no deterministic prediction could be made.

As for the idea that the smaller tremors reduce the risk by releasing energy, Bertolaso insisted that he had heard it from scientists at the Italian National Institute for Geophysics and Volcanology (INGV), and that he had used the same phrase in the past without being corrected by any of his seismology consultants. Enzo Boschi, former INGV president and one of the defendants, has denied this. The issue will be clarified when Boschi takes the stand.

The hearing also included some true scientific debate when Lalliana Mualchin, former chief seismologist for the Department of Transportation in California, testified as an expert witness for the prosecution. In 2010, when news about the indictment broke, Mualchin was among the few experts who openly criticized — and refused to sign — a letter supporting the indicted seismologists signed by about 5,000 international scientists.

Mualchin said that seismic hazards were not properly assessed in L'Aquila. "Italy is one of the countries with the best seismic knowledge in the world. And yet look at what a 6.3 earthquake has done to this city. That knowledge was not used, and scientists are responsible for that. They were conscious of the high risk in the area, and yet did not advise the people to take any precaution whatsoever," he said.

The problem is in part a scientific one, Mualchin said. The Italian scientists based their analysis on the frequency of earthquakes in the



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A panel of seismologists who met just days before the 2009 earthquake in L'Aquila, Italy are on trial over their reassurances to the public.

area. This is known as the probabilistic seismic-hazard analysis (PSHA), a method that is state of the art in many countries, but that, in Mualchin's view, systematically underestimates seismic hazard because it does not consider extreme and rare events.

"Frequency is not important, what really matters is the largest earthquake we can expect, the strongest one that has happened in the past. Risk prevention should be based on that," he said. This is the philosophy behind deterministic seismic-hazard analysis, a method that Mualchin says has been mostly abandoned by the scientific community, to the point that younger seismologists do not even learn about it.

"PSHA is a bad model California has exported elsewhere, and we see the results here in L'Aquila," he told *Nature* after the hearing. Mualchin worries that the new building codes approved in Italy after the L'Aquila earthquake show no improvement. "They never consider the worst-case scenario for any particular area, and this can lead to new disasters in the future".

The case continues.

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