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Lessons from the conviction of the L'Aquila seven: The standard probabilistic earthquake hazard and risk assessment is ineffective

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An earthquake of M6.3 killed 309 people in L'Aquila, Italy, on 6 April 2011. Subsequently, a judge in L'Aquila convicted seven who had participated in an emergency meeting on March 30, assessing the probability of a major event to follow the ongoing earthquake swarm. The sentence was six years in prison, a combine fine of 2 million Euros, loss of job, loss of retirement rent, and lawyer's costs. The judge followed the prosecution's accusation that the review by the Commission of Great Risks had conveyed a false sense of security to the population, which consequently did not take their usual precautionary measures before the deadly earthquake. He did not consider the facts that (1) one of the convicted was not a member of the commission and had merrily obeyed orders to bring the latest seismological facts to the discussion, (2) another was an engineer who was not required to have any expertise regarding the probability of earthquakes, (3) and two others were seismologists not invited to speak to the public at a TV interview and a press conference. This exaggerated judgment was the consequence of an uproar in the population, who felt misinformed and even mislead. Faced with a population worried by an earthquake swarm, the head of the Italian Civil Defense is on record ordering that the population be calmed, and the vice head executed this order in a TV interview one hour before the meeting of the Commission by stating "the scientific community continues to tell me that the situation is favorable and that there is a discharge of energy." The first lesson to be learned is that communications to the public about earthquake hazard and risk must not be left in the hands of someone who has gross misunderstandings about seismology. They must be carefully prepared by experts. The more significant lesson is that the approach to calm the population and the standard probabilistic hazard and risk assessment, as practiced by GSHAP, are misleading. The later has been criticized as being incorrect for scientific reasons and here I argue that it is also ineffective for psychological reasons. Instead of calming the people or by underestimating the hazard in strongly active areas by the GSHAP approach, they should be told quantitatively the consequences of the reasonably worst case and be motivated to prepare for it, whether or not it may hit the present or the next generation. In a worst case scenario for L'Aquila, the number of expected fatalities and injured should have been calculated for an event in the range of M6.5 to M7, as I did for a civil defense exercise in Umbria, Italy. With the prospect that approximately 500 people may die in an earthquake in the immediate or distant future, some residents might have built themselves an earthquake closet (similar to a simple tornado shelter) in a corner of their apartment, into which they might have dashed to safety at the onset of the P-wave before the destructive S-wave arrived. I conclude that in earthquake prone areas quantitative loss estimates due to a reasonable worst case earthquake should replace probabilistic hazard and risk estimates. This is a service, which experts owe the community. Insurance companies and academics may still find use for probabilistic estimates of losses, especially in areas of low seismic hazard, where the worst case scenario approach is less appropriate.