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The ESI scale, an ethical approach to the evaluation of seismic hazards

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The dissemination of correct information about seismic hazard is an ethical duty of scientific community worldwide. A proper assessment of a earthquake severity and impact should not ignore the evaluation of its intensity, taking into account both the effects on humans, man-made structures, as well as on the natural evironment.
We illustrate the new macroseismic scale that measures the intensity taking into account the effects of earthquakes on the environment: the ESI 2007 (Environmental Seismic Intensity) scale (Michetti et al., 2007), ratified by the INQUA (International Union for Quaternary Research) during the XVII Congress in Cairns (Australia).
The ESI scale integrates and completes the traditional macroseismic scales, of which it represents the evolution, allowing to assess the intensity parameter also where buildings are absent or damage-based diagnostic elements saturate. Each degree reflects the corresponding strength of an earthquake and the role of ground effects, evaluating the Intensity on the basis of the characteristics and size of primary (e.g. surface faulting and tectonic uplift/subsidence) and secondary effects (e.g. ground cracks, slope movements, liquefaction phenomena, hydrological changes, anomalous waves, tsunamis, trees shaking, dust clouds and jumping stones).
This approach can be considered “ethical” because helps to define the real scenario of an earthquake, regardless of the country’s socio-economic conditions and level of development. Here lies the value and the relevance of macroseismic scales even today, one hundred years after the death of Giuseppe Mercalli, who conceived the homonymous scale for the evaluation of earthquake intensity.
For an appropriate mitigation strategy in seismic areas, it is fundamental to consider the role played by seismically induced effects on ground, such as active faults (size in length and displacement) and secondary effects (the total area affecting).
With these perspectives two different cases studies have been reviewed: the destructive 1976 February 4 Guatemala, earthquake (M 7.5) and the 1743 February 20 Nardò, historical earthquake (Salento, Southern Italy). The re-analysis of both earthquakes contributes to define more realistic seismic scenarios in terms of intensities assessment and consequent regional seismic hazards.

References

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