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What do we know for assessing of seismic hazard?

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Seismic hazard assessment (SHA) is not an easy task that implies a delicate application of statistics to data of limited size and different accuracy. Note that statistics can never prove things, but disprove them. Seismic evidences accumulated to-date demonstrate that most of the general empirical relations commonly accepted in the early history of instrumental seismology can be proved erroneous. Making SHA claims, either termless or time dependent, quantitatively probabilistic in the frames of the most popular objectivists' viewpoint on probability requires a long series of "yes/no" trials, which cannot be obtained without an extended rigorous testing of the method predictions against real observations. We know that testing statistical significance of any probabilistic SHA requires geologic time span of evidence, which is usually not available. However, the heterogeneity of patterns of seismic distribution and dynamics are apparently self-similar following the Unified Scaling Law for Earthquakes (USLE) that generalizes the Gutenberg-Richter relationship by accounting for the fractal nature of faulting. Better understanding seismic process in terms of non-linear dynamics of the Earth's hierarchical system of blocks-and-faults and deterministic chaos, progress to new approaches in assessing seismic hazard, from term-less (probabilistic PSHA or deterministic DSHA) to time-dependent (t-DASH) including short-term earthquake forecasting (StEF). The confirmed reliability of pattern recognition results, along with realistic and exhaustive scenario modeling, allow concluding Science can better disclose Natural Hazards, assess Risks, and deliver the state-of-the-art knowledge of looming disaster in advance catastrophes along with useful recommendations on the level of risks for decision making in regard to engineering design, insurance, and emergency management.