PROBABILISTIC-DETERMINISTIC HAZARD SCENARIO FOR THE 1980 IRPINIA EARTHQUAKE M=6.9, SOUTHERN ITALY

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The integration of probabilistic and deterministic approaches, generally adopted for computing scenario of past and future high magnitude earthquakes, is one of the strong motion seismology major task in recent years. Such an integrated technique allows to overcame some of the limitations inherently present in both the deterministic and probabilistic approaches. In particular, the estimate of b-value and seismicity rate are largely uncertain in the case of a single causative fault and/or fault system. The empirical attenuation laws, that are used to estimate the ground motion level at a given site, generally do not account for the details of the rupture process at source (multiple events, source directivity, fault mechanism, heterogeneous faulting parameters,…) which can strongly affect the seismic radiation at local and regional scales. On the other hand, deterministic scenario does not provide any quantitative hazard estimation in terms of probability of exceedance and time of interest. We have developed a tool that integrates the probabilistic and deterministic techniques for the hazard scenario estimation. The deterministic approach is used for evaluating the earthquake effects associated with the rupture of a given fault and/or fault system in order to estimate the ground motion parameters and their variability needed by the probabilistic technique. For a given earthquake, the b-value is assumed as the one computed from the Gutenberg & Richter law of the seismogenetic zone in which the causative fault is embedded whereas the seismicity rate is computed assuming the "characteristic earthquake" recurrence model. Our hybrid technique has been applied to the case of an earthquake having the complex source geometry of the 1980, M=6.9, Irpinia (Southern Italy) earthquake producing hazard maps at regional scale.