

Uncertainty in early warning predictions of engineering applications of Earthquake Early Warning

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From the engineering perspective, the effectiveness of earthquake early warning systems (EEWS) depends only on the possibility of immediately detecting the earthquake and estimating the expected loss at a location of interest, in order to undertake actions to manage/mitigate the risk before the strike. The simplest proxy for the earthquake’s destructive potential is the peak ground acceleration (PGA), which is predicted through probabilistic seismic hazard analysis in the framework of EEWS. In this talk, the effects of different sources of uncertainty on the prediction of PGA are assessed with reference to the ISNet (Irpina Seismic Network) EEWS. First the analyses show how the uncertainty of the ground motion prediction equation dominates those of magnitude and distance, almost independently of the information available for the event. Secondly, based on these findings, information-dependent lead-time maps are defined (and provided for the Campania southern Italy) region. Finally, it is discussed how this approach may be used for estimating the expected loss for earthquake early warning purposes in the framework of the performance-based earthquake engineering.