

## Record-breaking earthquake forecasts

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We have previously shown that record-breaking earthquake inter-occurrence interval statistics can be used to distinguish clustered aftershocks from background seismicity. We have also shown that record-breaking interval statistics have the potential to detect accelerating moment release (AMR) precursory to some earthquakes (Yoder et al. 2010). We further develop these methods as forecasting tools. We compute record-breaking and mean-interval statistics over fixed length sub-sequences, as opposed to fixed time interval windows. The earthquake magnitudes to which the method is sensitive is related to the number of earthquakes in these sub-sequences. We introduce earthquake scaling laws and fault models to determine sequence lengths and catalog spatial extents to resolve various magnitude events in retrospective time series forecasts and hazard maps. We present examples from Parkfield, CA 2004, Baja California Norte 2010, Chile 2010, and Japan 2011. We also apply the method to identify foreshocks by detecting accelerating seismicity, rather than the expected Omori decay, following large earthquakes.