

HOMOGENEOUS SAMPLING FROM A SOUTH CALIFORNIA EARTHQUAKE CATALOG

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Abstract. Considerable spatial and temporal inhomogeneity of seismic data is demonstrated using the Southern California local earthquake catalog as an example. The catalog was used because it appears to be one of the best in the world considering the time span of the data compiled and the network density operated in the region. The revealed inhomogeneity can distort results of researches in regularity of seismicity genesis and searching for an influence of various exogenous forcing on this process. That is why it is necessary to use quasihomogeneous time series of seismicity from the beginning of a study. But doing so, we should retrieve for samples of the maximum possible size to provide sufficient statistical significance of the results. A key problem of the study is the choice of acceptable coarse grid in space and time based on a compromise between sample size and homogeneity. We consider a procedure of solving this problem on the basis of a detailed analysis of changes in the magnitude of completeness of the network through space and time. As the analysis main result, quasihomogeneous samples of the Southern California earthquake catalog were obtained different from each other in the magnitude of completeness of the sampling seismic events. These quasihomogeneous samples provide the basis for a higher level of statistical significance of the seismicity research results at different energy levels.

Keywords: seismicity, Southern California, earthquake catalog, catalog completeness, inhomogeneous data, quasihomogeneous sampling.