

Bayesian Estimation of the Spatial Variation of the Completeness Magnitude for the Venezuelan Seismic Catalogue

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We apply Bayesian inference in order to assess the completeness magnitude M_c of an instrumental seismological catalogue compiled by the Venezuelan Foundation for Seismological Research during 2000-2010. The catalogue consist of 18774 well localized earthquakes. The events registered in this catalogue have been detected by the Venezuelan Seismological Network. The earthquakes are analyzed under the approach known as the Bayesian magnitude of completeness (BMC) method. In particular, we explore the spatial variation of M_c depending on the minimum number of stations that detected the seismic event and the distribution of seismic stations. We explore this technique to characterize the quality of the catalogue, to perform high resolution M_c mapping and to minimize errors in the M_c estimates due to spatial heterogeneities.

Key Words: earthquakes, Bayes' theorem