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An analytical method about anomalies on the synthetical variables of the multiple seismic activity parameters—taking 2 M =7 earthquakes occurring in Qinghai as examples

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Based on the random field theory, a new method of the synthetical variables of the multiple seismic activity parameters has been proposed. This method is that the natural perpendicular function development has been used on the random field function of seismic activity first. And then the synthetical variables constituted of the linear combination of four seismic activity parameters, i.e. the seismic strain release $\sqrt{E}$, the average distance between each two earthquakes D, the average time interval between each two earthquakes T, and the earthquake occurrence rate N have been studied. Though the analysis on the synthetical variables about the field, the seismic activity anomalies before large earthquakes have been drew. As the examples, the Gonghe M=7.0 earthquake occurred in Qinghai, 1990 and the Yushu M=7.1 earthquake occurred in Qinghai, 2010 have been discussed. The results have showed that before the two M=7 earthquakes, the main synthetical variables have all showed obvious abnormal variations, displaying better corresponding relationship with these two earthquakes. The synthetical variables of seismic activity field can focus on the slight differences which are included in each original variable. And the abnormal variations showed from the synthetical variables are as obvious as possible. The authors think that the synthetical variable method is possibly an effective analytic technique.

Key words: seismic activity field; natural perpendicular function development; synthetical variables; anomaly; Earthquake example