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A Study on Source Parameters of Yao'an Earthquake Sequence, Yunnan, China

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On Jan.15, 2000, two moderate earthquakes with magnitude 5.9 and 6.5 occurred successively in Yao'an, Yunnan, China. Six sets of digital seismometers were set in the epicentral area to form a seismic network near the epicenter for monitoring the sequence and to record digital waveforms. Total 2829 aftershocks had been recorded from 16:13 Jan.15, 2000 to 07:26 Feb.1, 2000. Because the seismic network was close to the epicenters of the earthquake sequence, seismograms small events show very high level of signal/noise ratio. Using these data, we can achieve more reliable results of earthquake source Parameters. Based on former work on medium quality Q for the research area and the source spectral parameters for some portion of Yao'an sequence gotten from records of permanent stations in Yunnan, China, The site response for every mobile digital station was obtained. Then source parameters were calculated for earthquakes with at lest there station records in this sequence. Source spectral parameters including the flat level, corner frequency and seismic moment, stress drop and equivalent fracture radius. It is noted that because of limitations of time and selection of field conditions for the mobile stations, the sites were not good enough. In this case the results of site response would affect the calculation of source parameters strongly. In this study, we took source parameters of portion of the sequence from permanent stations near research area and medium quality Q as known conditions and calculated site responses of the mobile stations. Then genetic algorithms were adopted to get source spectra and source parameters. In terms of theoretical derivation and the actual data of calculation, the results in this study were reliable and reasonable.