ESTIMATION OF STRONG GROUND MOTION PARAMETERS OF INITIAL PART OF P-WAVE FOR EARLY WARNING SYSTEMS IN THE AZARBAIJAN REGION

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Keywords: Early Warning, Peak Ground Motion, Azerbaijan, On-Site Method

Two earthquakes, Ahar & Varzeghan occurred in August 10, 2012 in Azerbaijan region. Their magnitudes were 6.2 and 6.1 respectively. These earthquakes had 80 aftershocks and caused many casualties and financial losses. Since in this region we are facing with numerous historical and instrumental earthquakes and there is an important fault in north of Tabriz city, we are worried about upcoming earthquakes. In this research we will map the recorded earthquakes by building and housing research center stations and find early warning parameters for Azerbaijan region. These parameters are found by on-site method. Therefore first Ahar & Varzeqan earthquake and aftershocks records were examined and those which at a distance off 100Km from the epicenter were separated and after applying appropriate filter, the records of noise were omitted too. Finally 149 the records of total 262 records remained, and Pd (maximum displacement in first 3 seconds of P-wave) from the vertical component of the filtered displacement records, which Kanamori and Nakamori mentioned in 2005, were taken. Processing is done in SAC and three empirical correlation (correlation of 1, 2 and 3) between Pd with Peak Ground Motions (PGA, PGV, PGD) is presented for this region to be used as a preliminary for early warning systems startup in Azerbaijan Region.

\[
\begin{align*}
\log(\text{PGA}) &= 0.5754 \log(\text{Pd}) + 1.280.7106 \\
\log(\text{PGV}) &= 0.8426 \log(\text{Pd}) + 0.43860.4574 \\
\log(\text{PGD}) &= 1.0312 \log(\text{Pd}) + 0.33970.3153
\end{align*}
\]

Figure 1. The relationship between peak–displacement amplitude in the initial 3s part of the P waves (Pd) and PGA for epicentral distances less than 100 km for the Azarbayjan Region. In the process, only vertical components of 149 records from 23 events are used.
Figure 2. The relationship between peak–displacement amplitude in the initial 3s part of the P waves (Pd) and PGV for epicentral distances less than 100 km for the Azarbaijan Region. In the process, only vertical components of 149 records from 23 events are used.

Figure 3. The relationship between peak–displacement amplitude in the initial 3s part of the P waves (Pd) and PGD for epicentral distances less than 100 km for the Azarbaijan Region. In the process, only vertical components of 149 records from 23 events are used.

REFERENCES


