

An alternative approach for the Istanbul Earthquake Early Warning system

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Two recent catastrophic earthquakes that had struck the Marmara Region on 17 August 1999 (Mw 7.4) and 12 November 1999 (Mw 7.2) have caused major concern about future earthquake occurrences in Istanbul and in the Marmara Region. As a result of the preparations for an expected earthquake in Istanbul, an early warning system has been established in 2002, as a part of Istanbul Earthquake Rapid Response and Early Warning Project (IERREWS), with a simple and robust algorithm, based on the exceedance of specified threshold time domain amplitude and the cumulative absolute velocity (CAV) levels (Erdik et al., 2003). In order to improve the capability of Istanbul Earthquake Early Warning system (IEEWS) and to rapidly assess the effects of a damaging earthquake for the purpose of earthquake early warning in the Marmara Region, we explored an alternative approach to earthquake early warning with the use of a ground-motion parameter (TauC) and high-pass filtered vertical displacement amplitude parameter (Pd) from the initial 3 s of the P waveforms as proposed by Kanamori (2005) and by Wu and Kanamori (2005). The empirical relationships both between TauC and Moment Magnitude (Mw), and between Pd and Peak Ground Velocity (PGV) for the Marmara Region are presented. These relationships can be used to detect a damaging earthquake within seconds after the arrival of P waves, and can provide on-site warning in the Marmara Region.

Keywords: Early Warning, Earthquake Mitigation, Predominant Period, Max. Displacement, PGA, PGV