Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

SSS25-04 Room:A04 Time:May 25 09:45-10:00

STRONG GROUND MOTION SIMULATION of THE 24 MAY 2014 NORTH AEGEAN SEA EARTHQUAKE (Mw 6.9) in TEKIRDAG and SURROUNDING AREA

KARAGOZ, Ozlem[1*] ; CHIMOTO, Kosuke[1] ; YAMANAKA, Hiroaki[1] ; OZEL, Oguz[3] ; CITAK, Seckin ozgur[4]

[1]Department of Environmental Science and Technology, Tokyo Institute of Technology, Tokyo, Japan, [2]Department of Geophysical Engineering, Canakkale Onsekiz Mart University, Canakkale, Turkey, [3]Department of Geophysical Engineering, Istanbul University, Istanbul, Turkey, [4]JAMSTEC

The Marmara Region (NW Turkey) was affected from destructive earthquakes since historical times. The North Anatolian Fault with 1,200 km length is the main source of the earthquakes in the region. The most recent 1999 Kocaeli Earthquake (Mw 7.4) damaged residential and industrial areas of the large cities in Marmara. The future earthquake is expected on the northwestern segment of the fault close to the city of Tekirdag.

In this study, we simulated strong ground motion records of the 24 May 2014 North Aegean Sea Earthquake (Mw 6.9) in Tekirdag and surrounding area. We used one-dimensional homogeneous horizontal layer model at each AFAD (Republic of Turkey Prime Ministry Disaster & Emergency Management Presidency Earthquake Department) strong motion station site in Tekirdag and surroding area (i.e. 5904, 5902, 5907, 5906), Canakkale (i.e. 1701, 1710), Gokceada (1711), Edirne-Enez (2201). We combined our shallow model (0-250 m) that obtained from our previous microtremor explorations (Karagoz et al., 2014) and the deeper parts were taken from pervious crustal studies in the region. The outer fault parameters of the mainshock (seismic moment, strike, dip, and rake) were determined by previous focal mechanism solutions studies while the inner fault parameters were estimated by following the recipe of Irikura and Miyake (2011).

The fault plane (background) and asperities were divided into several subfaults that were assumed as single double-couple point source. We defined appropriate Kostrov-like slip-velocity function (modified by Nakamura and Miyatake, 2000) for the asperity areas to simulate high frequency ground motions. The synthetic seismograms were obtained using a deterministic discrete wave number method for each sub-fault and were summed to get full waveform at the station around the epicentre in a broadband frequency range (0.1-10Hz).

The simulated peak ground velocities at the ground surface were estimated by multiplying the simulated ground motion at the top layer of Vs=780 m/s from the discrete wave number method with 1D amplification factors of S-waves in the shallow soil layers derived from the microtremor explorations. For validation, the results converted accelerations and were compared with S-wave portions of the recorded acceleration waveforms at the strong motion stations.

Keywords: Discreete wave form method, earthquake waveform simulation, Gokceada, site effect, Tekirdag