Out of 100 Istanbul Rapid Response Network strong motion stations 55 stations and Ataköy, Zeytinburnu and Fatih vertical arrays which are composed of downhole triaxial accelerometers located at the various depths and on the ground surface are located within the area where detailed microzonation study was conducted.

There have been few small earthquakes in the recent years with local magnitude slightly over M=4. Vertical array stations at 4 levels and some of the 55 Istanbul Rapid Response Network stations recorded these earthquakes. The acceleration time histories recorded by the Rapid Response stations as well by the vertical array stations were used to model the recorded motion characteristics in terms of peak ground accelerations and acceleration response spectra using the recorded acceleration time histories on the engineering bedrock. The recorded acceleration time histories are modelled based on empirical site amplification relationships proposed by Borcherdt and based on a modified version of Shake91. The results indicate the suitability of the site response analyses in modelling the observed variation with respect to peak ground acceleration.

An attempt is also made to model the recorded acceleration time histories during the Mw=7.4, 1999 Kocaeli Earthquake recorded at Ataköy, Fatih and Zeytinburnu strong motion stations located in the same area. Preliminary modelling at vertical array stations were rather successful indicating the suitability of the vertical arrays in fine tuning the measured shear wave velocity profiles for modelling and prediction at higher ground shaking levels.