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Comparison of the bedrock depth from array measurements of Rayleigh waves associated with microtremor and seismic profile obtained the Seismic Reflection Data, Eskisehir Basin, Turkey

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Ground motion estimation for future earthquakes is one of the most challenging problems in seismology and earthquake engineering. The bedrock depth has a considerable seismic risk for the urban area of Eskişehir. In this study, multiple station microtremor measurement methods which are more practical, non-distructive, fast and economical compared to seismic reflection method were implemented. These method using microtremor recordings have become a very useful data for microzonation studies because of their simple acquisition and analysis. Extensive ambient noise measurements were performed in the basin of Eskisehir from June 2010 to spring 2012. We use data recorded by a broadband seismometer and digitizer CMG-6TD, Guralp seismometer. Some of the measurement locations, the CMG-6TD sensor was located into 30 cm-deep holes in the ground to avoid strongly wind-generated, long-period noise. Dominant frequency (f), bed-rock depth (h) and shear-wave velocity (Vs) were determined from Spatial Autocorrelation (SPAC) methods. With the SPAC Method, it is possible to constrain the velocity structure underlying the site using microtremor array measurements. The results obtained were compared to the 96-channel seismic reflection data with explosive energy source. Several seismic reflection surveys with P-Gun seismic source have been performed on the same place with array measurements. We used two types of seismic sources: 36 cartridge Gun. Shot interval was 10 meters, group interval (one geophone per group, 48 geophones in total) was 10 meters, near offset was 10 meters, far offset was 480 meters, CDP interval was 5 meters. We adapted the “Off-End Spread” technique while using the Gun. Reflection images within the sedimentary section correlate well with the velocity structure obtained from SPAC.