



Assessment of the Fundamental Resonance Frequency of the Sedimentary Cover in the Eskisehir Basin (Turkey) Using Noise Measuremeets

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Geological observations indicate that the Eskisehir graben is related with Eskisehir Fault Zone (EFZ), one of the major active structures within the Anatolian plate. The fault zone has a considerable seismic risk for the urban area of Eskisehir. Local site conditions substantially affect the characteristics of seismic waves and generally have a direct effect on the potential of the earthquake damage. Site effects are very complex factors. The importance of site response is well known, and few would question the assertion that the motion on soil is usually greater than on rock, when all other things were being held equal. In general, site response estimation can be obtained from instrumental recordings. The purpose of this study was to estimate if there would be a relationship between the structural geology in the Eskisehir Basin and the fundamental resonance frequency. Extensive ambient noise measurements were performed in the basin of Eskisehir from June 2010 to spring 2012. In this work, we conduct microtremor surveys to investigate the 3-D basin structure of Eskisehir Basin and determine the fundamental resonance frequency of the sedimentary cover in the Eskisehir Valley area. The measurements of single-station microtremor were carried out at 318 sites in the Eskisehir Basin. 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. Finally, a map showing the fundamental resonance frequency distribution in the studied area was drawn using the results obtained from applying the HVSR technique. A fundamental resonance frequency map of the Eskisehir Basin was produced from main peak in the horizontal-to-vertical component (H/V) spectral ratio.