Geophysical Research Abstracts
Vol. 16, EGU2014-14246-1, 2014
EGU General Assembly 2014

Applications of MASW Method with Different Offsets and Geophone Geometries in Buca District of Izmir City, TURKEY

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Shear-wave velocity is so critical parameter for evaluating the dynamic behaviour of soil in the subsurface investigations. Multichannel Analysis of Surface Waves (MASW) is a popular method to utilize shear-wave velocity in shallow depth surveys. This method uses the dispersive properties of shear-waves for imaging the subsurface layers. In MASW method, firstly data are acquired multichannel field records (or shot gathers), then dispersion curves are extracted. Finally, these dispersion curves are inverted to obtain one dimension (1D) Vs depth profiles. Reliable and accurate results of evaluating shear wave velocity depends on dispersion curves. Therefore, determination of basic mode dispersion curve is very important. In this study, MASW measurements were carried out different types of spread and various offsets to obtain better results in İzmir, Turkey. The types of spread were selected as pairs geophone group of spread, increase spread and constant interval spread. The data were collected in the Campus of Tinaztepe, Dokuz Eylul University, Izmir (Buca). 24 channel Geometrix Geode seismic instruments, 4.5 Hz low frequency receiver (geophone) and sledge hammer (8kg) as an energy source were used in this study. The data were collected with forward shots. MASW measurements were applied different profiles and their lengths were 24 m. Geophone intervals were selected 1 m in the constant interval spread and offsets were selected respectively 1, 4, 8, 12, 24 m in all spreads. In the first stage of this study, the measurements, which were taken in these offsets, were compared between each other in all spreads. The results show that higher resolution dispersion curves were observed at 1 m, 2 m and 4 m offsets. In the other offsets (8, 12, 24 m), distinguishability between basic and higher modes dispersion curves became difficult. In the second stage of this study, obtained dispersion curves of different spread were compared to all spread type of MASW survey.