



Near-surface seismic refraction method applied to characterize subsurface in Eastern Saudi Arabia

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We have carried out a near-surface seismic refraction study in an area around the city of Dammam, Eastern Saudi Arabia, in order to understand the underlying geologic strata and to determine depth to the water table. This work was conducted as part of a larger study in developing a numerical simulation model to identify and predict shallow groundwater level rise in coastal areas of Eastern Province in Saudi Arabia. A total of nine refraction profiles were acquired using a 24-channel StrataVisor NZXP (Geometrics) exploration seismograph. Seismic waves generated from multiple shots were recorded on 14-Hz vertical geophones spaced at 5m intervals. The wave source was a 10-Kg hammer striking at a 10X10cm heavy steel plate. Each shot record was stacked 10 to 12 times to increase the signal to noise ratio. The location and the geometry of the profiles were selected to cover industrial, agricultural and residential areas in and around the city of Dammam and to provide sufficient coverage to obtain subsurface seismic velocity information. The data processing was done using SeisImager software from Geometrics. Preliminary results show two major velocity layers, apart from a top layer related to the unconsolidated soil. One layer indicates the depth to the water-table and the other at the overburden-bedrock boundary. Further processing work is currently underway to verify the results. We are also installing ten piezometers down to the top of the bedrock in order to correlate the results obtained from the refraction profiles. We believe the final results of this study will provide basic information needed to identify and predict shallow groundwater rise in the region.