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## Land Surface Waves: a Quantitative Geophysical Tool

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**ADAMY Jerome**<sup>1</sup>, **MOUTON Edouard**<sup>2</sup>, and **DURAND Gregory**<sup>2</sup>. (1) *SISMOCEAN, 23 rue de la cite blanche, 34200 Sete, France, phone: ++33 467 536 192, jerome.adamy@sismocean.com*, (2) *SISMOCEAN, 34200 Sete, France*

One way of characterizing the subsoils at shallow depth, is to determine the shear wave velocity [Vs] depth profile. This is now recognized as a pertinent non invasive method for the evaluation of the material properties (shear modulus) in soil and rock deposits. The shear modulus, Gmax, as other moduli, such as Young's modulus , E, or the compression modulus, M, provides with valuable information for settlement calculations or for finite element modeling. Multi-channel surface wave [MASW] technique is capable to produce an easily understood depth profile. Changes of the soil properties can be detected by a MASW profiling system. For large survey areas, a fast acquisition is obtained by operating gimballed geophones which can be dragged over the soil. Otherwise, classical coupling between soil and geophones is performed. The cost of the time spent in the field is often a limiting factor to the amount and eventually also to the quality of the data that are collected in geotechnical investigations. A geotechnical investigation can be easily optimized by running a MASW survey which highlights the soil conditions at a very reasonable cost compared to other techniques. SISMOCEAN uses different types of seismic sources : hammer blow, dynamite or natural noise (micro-tremor). The capability of working with micro-tremor allows us to acquire data in noisy conditions (urban areas, industrial plants, etc.). The seismic data are typically recorded with 24 to 72 geophones equally spaced (typically from 1 to 3 meters). Representative examples and results are shown in this paper. We will also show how cavities can be perfectly detected using natural noise as a seismic source.

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