
Underwater Marine Surface Waves

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Nearshore and coastal surveys are scheduled to acquire soil data for the design of pipeline landfalls, pipeline routes in shallow water, jetties and breakwaters, loading / unloading facilities for LNG and oil terminals, and other coastal developments. The underwater multichannel analysis surface wave [U-MASW] is a very efficient quantitative geophysical tool to investigate the upper part of the seabed. It is also complementary to standard geophysical tools such as subbottom profilers, seismic reflection which give qualitative information. U-MASW data are collected using a bottom-towed acoustic source and a low frequency hydrophone streamer. The data processing is briefly addressed in this paper. The output is a number of continuous shear wave [Vs] depth profiles covering the surveyed area. The Vs depth profile delivers quantitative soil data directly linked to the shear modulus. This can be used to position boreholes in order to sample a maximum number of soil configurations over the surveyed area. The U-MASW is also perfectly well adapted to investigate or localise areas where very soft soils are encountered. Several sites have already been investigated by SISMOCEAN using the U-MASW tool, and representative examples are presented in this paper. The U-MASW allows for a penetration depth ranging from 3m below seabed [bsb] to 50m bsb. The penetration depth is totally independent of the water depth. The sailing speed during acquisition is 2 knots. Thus, 24 nautical miles can be surveyed per 12 hours shift. A route of 100 km long is surveyed in less than 3 shifts, which makes the U-MASW a tool that should be considered for pipeline route surveys, as well as for harbour development and pre-dredge surveys.
