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INTERACTIVE ACOUSTIC MAPPING OF THE SEABED

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ABSTRACT

The ability to develop offshore resources in a safe and cost-effective manner is predicated on a knowledge of the nature and behavioural properties of the seabed (Clark and Guigné 1988). Conventional geophysical site investigations can provide estimates of these properties, however, the cost and complexity of such studies have been increasing. There is a demand and requirement for more accurate three dimensional representations of subsurface properties. While new developments in digital signal processing can enhance the final product, the outcome is still limited by the data quality that is acquired at the outset.

Developments in digital signal processing, advancements in acoustic transducers and sonar systems and new applications of heuristic information handling are reshaping the directions by which acoustics may be able to image the bottom sediments. This paper exhibits a new trend in acoustic mapping of sediments. An interactive layer-by-layer acoustic core concept is discussed with a particular emphasis placed on the requirements for optimising in situ, the criteria of temporal and spatial resolution, of source coherence and of stationarity of acoustic receiver-sources. These factors contribute to the acquisition of very high quality data. Acoustic core products will be presented from trials on multi-layer seabeds, from thin contaminated sediments in inland waters, and from laboratory physical modelling studies. Correlations between the acoustics and engineering properties of the imaged sedimentary layers will be a key point in the paper.

REFERENCES

Clark, J I and Guigné, J Y, 1988, Marine Geotechnical Engineering in Canada, Canadian Geotechnical Journal, Volume 25, Number 2, Pages 179-198.