



Effect of inhomogeneous seabed characteristic on underwater object detection using DC resistivity method

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Because targets of underwater object detection are often moving in unpredictable environment, a real-time detection and tracking system is required. To effectively detect objects with electrical properties, the electrical or electromagnetic methods can be preferred. In this study, we focus on the electrical resistivity method for underwater object detection. In general, electrical resistivity survey data are processed using an inversion technique to present electrical anomalies. However, the inversion algorithm may not be appropriate for the real-time detection system, because it requires an amount of time to process 3D data. For this reason, we choose a method of comparing background data with real-time survey data. In this case, it is important to set and update background data. This is because various seabed and water layer environments, such as mud flat, anomalies under electrode array, water temperature, salinity and other factors, affect electrical resistivity of background media. In this study, we investigate the effect of inhomogeneous seabed characteristic for real-time detection algorithm by applying it to synthetic data for various cases and to our water tank experiment data. Our experiments show that the effect of inhomogeneous underwater environments causes complexity in observed data, but it can be successfully separated as background value for real-time underwater object detection.

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