CLASSIFICATION OF MULTIBEAM SNIPPETS DATA USING STATISTICAL ANALYSIS METHOD

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I humbly dedicate this thesis to

My Grandmother
Wong Ksuin

My Beloved Parent
Lau Mun Hong & Hui Mew Ying

My Family Members
Lau Sook Fun
Lau Sook Yen
Lau Kum Fai

My Loved One
Lim Li Xin

Buddies & Friends

Thanks for your support and encouragement.
Thanks for the blessing and best wishes.
Thanks for the sacrifice and patience.

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ABSTRACT

The multibeam snippets data, an acoustic backscatter data acquired by the multibeam sonar systems, carries important information about the seafloor and its physical properties, thus aid in seafloor classification. This acoustic backscatter strength is highly dependent of incidence angle due to different mechanism of scattering with different angular domains. Therefore, it is necessary to perform certain corrections for the backscatter data before producing the hydrographic plan. This is solved with the radiometric correction using CARIS HIPS & SIPS 7.0 software and geometric correction using Matlab programming. Radiometric correction removed the Time Varied Gain from the data while geometric correction corrected the data for local bottom slope, seafloor insonified area and angular dependency. The seafloor can be classified using the produced distribution histogram of the desired study area. It is found that the snippets intensities estimated from the mean of snippets intensities provide an accurate measurement of the actual intensities strength of the seafloor and play an important role in correcting the angular dependency of the data. Besides that, the Gamma distribution model is found to be fitting well with the distribution of snippets intensities. The parameters of the Gamma distribution model, the scale and shape parameters are found to be dependent on the incidence angles of data. Furthermore, the Kolmogorov-Smirnoff test was carried out to access the fitting of other statistical distribution models such as the Rayleigh and Log-normal distribution models in fitting with the distribution of snippets intensities. It is shown that the Rayleigh and the Log-normal distribution models followed only with the head of the distribution of the experimental data but not towards the tail of experimental distribution. Further experiment on comparing the backscattering characteristics of snippets data that were collected from different types of seafloor habitats is recommended for future research.
ABSTRAK