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Side scan sonar image enhancement using wavelet analysis Case study: EdgeTech FS4200 digital side scan sonar image

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A new approach is presented to remove any noise which is not related to backscattering properties of seabed from side scan sonar images using wavelet as a scale-based analysis. The main reasons of using wavelet are: (i) Though the stochastic characteristic of noise, wavelet analysis is less sensitive to noise; (ii) wavelet basis functions are local so it would be more efficient to adapt inhomogeneous signals than the traditional techniques. In this paper, firstly a comprehensive study is done to select a well-fitted wavelet base function by orthogonal wavelet decomposition pyramid for a side scan sonar image. Following this, the low frequency components of the image compared to swath width are interpreted and removed. Finally, by using the inverse transform, the enhanced image will be reconstructed. As a case study, a selection of EdgeTech FS4200 side scan sonar images is included. These images were recorded during the actual recent post-lay survey project in South Pars Gas Field, Persian Gulf. A presentation of the theoretical details and results of this case study follow.