# LITHOLOGICAL AND STRUCTURE FEATURES EXTRACTION USING MULTI DATA FUSION ALOGRITHMS, NORTH EASTERN DESERT, EGYPT

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ABSTRACT

In this paper SPOT-panchromatic image with 10 m spatial resolution was fused with ASTER-band ratio images with 30 m spatial resolution. The fusion of SPOT image with ASTER band-ratio data using principle component (PC), Wavlet (Wt), Gram-Shmidt (GS) and Modefied Intensity Hue Saturation (MIHS) transform techniques proved to be excellent for both lithological and structural mapping as it preserves the spectral information of ASTER and SPOT data. By visually comparing of these data fusion, the MIHS and WT, methods produce high color distortion with respect to the original image, while it preserves a perfect spatial resolution. The PCA fusion method produce very low color distortion but it dose not preserve all the spatial information. The GS fusion method produce very low color distortion as well as preserve all the spatial information which look sharper than the other images. This study revealed that, the Gram-Schmidt fusion method looks the best method comparing with the other methods in terms of the quality of spectral and spatial information. By quantitatively analyzed using the correlation coefficient, The CC is ranging from 0.406 to 0.455 using MIHS fusion method. While by using Wavlet transform, the CC ranging from 0.955 to 0.988. Wherever, The CC between the multispectral input data and the output fused image is ranging from 0.988 to 0.996 using automatic PCA fusion technique. By using manual PCA fusion technique, the CC is ranging from 0.978 to 0.997, so there is no big different between the automatic and the manual PCA methods. The best CC between the multispectral input data and the output fused image is ranging from 0.989 to 0.999 using Gram-Schmidt fusion technique .

Key Words: Remote Sensing - ASTER-SPOT -spectral characteristics analysis –band ratio-data fusion-correlation coefficient.