A COMPARATIVE ANALYSES OF IMAGE FUSION TECHNIQUES FOR SPOT5 DATA: AN EXAMPLE FROM ISTANBUL

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Technical Commission VII Symposium 2010

KEY WORDS: Environment, Land Cover, Analysis, Comparison, Fusion, SPOT

ABSTRACT:

The concept of image fusion term includes multiple techniques used to combine the geometric detail of a high-resolution panchromatic image and the color information of a low-resolution multispectral image to produce a final image. The fused product is a multispectral image with the highest possible spatial resolution available in within the data set while still preserving good spectral information quality. A region which contains the diversity of the land cover and use categories in European side of Istanbul, Terkos Water Basin was selected as the test study area. In this study, nine different fusion methods were applied to SPOT 5 multispectral and panchromatic data including such as Principal Component Analysis (PCA), Brovey transform, Intensity Hue Saturation (IHS), Modified Intensity Hue Saturation (mIHS), Multiplicative Transform, High Pass Filters (HPF), and Local Mean Matching, Mean Variance Matching (LMVM) and Wavelet transform (WT). The results were compared by using visual interpretation and statistical methods. The objective comparison of the visual quality of fused images is a difficult task. The human visual system is not equally sensitive to various types of distortion in an image. Because of this a group of people was organized to judge the fused products. To evaluate spectral improvement, transect that includes different land cover types was selected. The correlation (CC), Root Mean Square Error (RMSE), and RASE between MS and fused data were calculated for this transect for each band and for each method to find out the degree of spectral enhancement. All results obtained for test site were presented as graphics and statistics.

TOPIC: Data fusion and data assimilation
ALTERNATIVE TOPIC: Remote sensing applications