

A Comparative Analysis of the Recent Vegetation Cover Change in the Three Gorges Area Using 5 Years of MODIS Time Series Data

Liu Zhengjun, Ding Yanmei, Wang Jian, Zhang Jixian

chinese academy of surveying and mapping

zjliu@casm.ac.cn

As the world's biggest dam, the Three Gorges dam is under construction in the upper reaches of the Yangtze River. Building this dam has involved many population migrations and resettlements which resulting in significant land use / land cover changes since 1990's. This may have certain impacts on the regional ecosystem and environment. In this paper, we mainly investigated the vegetation cover change in the three gorge area over recent five years by using the MODIS 16-day NDVI composite and 3 different periods of Landsat TM/ETM+ images which represent different dam constructive stages. Since the severe noise and data missing contained in the 16-day composited time series dataset, a robust change detection algorithm is necessary. For that reason, we have developed a new change detection method based on the Empirical Mode Decomposition (EMD) and Hilbert-Huang Transform (HHT) for time series analysis. The time profile of each ground pixel is processed by the EMD and changes at different time frequency are analyzed with HHT. Determination of five-year trend of vegetation change is achieved by this method. The proposed methodology is compared with traditional Principal Component Analysis (PCA). Change detection accuracy is assessed and validated with Landsat TM/ETM+ data. Comparative results shows the EMD and HHT are more effective for the analysis of the MODIS time series vegetation index datasets. The analytical results also show the seasonal characterization and inter-annual changes of vegetation cover.