PSEUDO-VARIANT FEATURES ANALYSIS OF LANDSAT IMAGERIES FOR CHANGE DETECTION OF MANGROVE FORESTS IN BELIZEAN COASTAL AREAS

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Abstract: Mangrove forests are a globally important ecosystem. They provide ecological and economic services for human society. Mangrove forests are also considered as carbon sinks to sequester carbon dioxide (CO_2) emitted due to human activities, and provide habitats for a large population of fauna and flora species. In Belize, the overly coastal development to meet the human pressing basic needs has driven the deforestation of mangrove forests, consequently causing environmental issues. Thus, we need to understand the spatiotemporal changes in mangrove forests to evaluating current mangrove forests management practices and formulating a better long-term strategy of mangrove ecosystem. This study focuses on detecting changes of mangrove forests using Landsat imageries in Belizean coastal areas during the period 1989-2000. The data were processed based on an analysis of the pseudo-invariant features (PIFs) through three main steps: (1) image rectification to account for geometric different between the pair of images; (2) image normalization using PIFs to eliminate spectral variations of land-cover features between the two periods to find out unchanged pixels as a reference; (3) using pseudo-variant features (PVFs) method detects the change areas from the normalized images. The preliminary results revealed the close correlation between the two images on the same band that could be easy to extract PIFs by using a simple threshold. The result of change detection map also presents a good quality using the PVFs extraction method. The results proved the ability of using the PVFs methods in mangrove forest change detection.

Keywords: PVFs, Mangrove forests, change detection, Landsat data, Belize