MULTI-TEMPORAL CLOUD DETECTION METHOD FOR REMOTELY SENSED DATA OVER HETEROGENEOUS LAND SURFACE REFLECTANCE

N. Roslan*[a,b], M.N.M. Reba[a,b] and M. Askari[c]
[a] Faculty of Geoinformation and Real Estate,
[b]Institute for Geospatial Science and Technology (INSTEG),
[c]Institute of Water Resource Management (IPASA),
Universiti Teknologi Malaysia, 81310, UTM Johor Bahru, Johor, MALAYSIA.
*Corresponding author. Email:nhaniroslan@gmail.com

KEYWORDS: AVHRR, cloud detection, image enhancement, multi temporal cloud detection, heterogeneous land surface.

Cloud covers limit the interpretation and analysis of remote sensing image and this becomes very significance for the image taken in the tropical region. However, the information related to cloud is useful for rainfall estimation. Low and medium spatial resolution images are suitable for cloud detection analysis as large spatial coverage can be benefited. Cloud detection technique requires spectral bands of visible and infrared to differentiate between pixel of clouds and land surface by determining higher reflectance pixels in visible wavelength. Though, it is a challenge to apply cloud detection on low spatial resolution data as the pixel is misleadingly presenting cloud pixel due to mixing reflectance between cloud and land surface. This phenomenon is obvious within the heterogeneous land surface by which the false detection can be occurred. The Local Area Coverage (LAC) Advanced Very High Resolution Radiometer (AVHRR) data with five spectral channels (i.e., visible to infrared bands) is used. This paper highlights a revised multi-temporal cloud detection method (MTCD) using multi-temporal AVHRR images taken under constant viewing angles. Image enhancement is carried out on ten AVHRR LAC images acquired at different time. Cloud-free image is selected from series of image and used as reference to flag cloudy pixels in the rest of AVHRR images. Cloud classification is performed by means of threshold analysis applied on cloud pixels in thermal, visible and infra-red bands for each daily image. The result is validated by spatially comparing with 1km-MODIS cloud product. MTCD demonstrates promising accuracy of cloud feature detection that is independent to heterogeneous reflectance from land by which less false cloudy pixel detection is performed.