PROCEEDINGS

GRSS YOUNG PROFESSIONALS AND ISPRS SC SUMMER SCHOOL

Federal University of Mato Grosso do Sul
Campo Grande/MS Brazil
October 28 to November 1, 2018

Hermerson Pistori; José Marcato Junior; Amaury Antônio de Castro Júnior; Edson Takashi Matsubara; Maurício de Souza Celso Soares Costa; Isadora Taborda Silva e Nayara Vasconcelos Estrabis.

H/ALPHA DUAL-POL DECOMPOSITION FOR MAPPING LULC IN A REGION OF AMAZON FOREST

JULIANA MARIA FERREIRA DE SOUZA DINIZ [1]
FABIO FURLAN GAMA [1]

[1] INSTITUTO NACIONAL DE PESQUISAS ESPACIAIS
PÓS-GRADUAÇÃO EM SENSORIAMENTO REMOTO, SÃO JOSÉ DOS CAMPOS - SP
juju-dinizsvm@hotmail.com; fabio@dpi.inpe.br

Human occupation has been noticeable in the Amazon Forest due to the expansion of agricultural production systems that result in deforestation and environmental impacts. Remote sensing is therefore useful for mapping and monitoring land use and land cover (LULC) in the region. However, quasi-permanent cloud cover makes this monitoring difficult with optical sensors. Synthetic Aperture Radar (SAR) imagery became a successful alternative for mapping LULC in cloudy areas. H/Alpha decomposition is one of the radar techniques that provides the best understanding of polarimetric SAR images. The goal of this study is to assess dual-pol H/Alpha decomposition technique with Sentinel-1A data for mapping LULC in a selected region of the Amazon Forest through Random Forest classifier. In this study, it was evaluated an image acquired in September 2017 by the Single Look Complex (SLC) Sentinel-1A (C-band). The raster image was processed using SNAP prior to the subset selection of the study area; the sub-swaths were de-burst and the precise orbit file was carried out. The multilooking were applied with four looks. Dual-pol H/Alpha decomposition was calculated and a Lee Speckle filter (5x5 window size) was applied. The outputs of H/Alpha decomposition were terrain correct with an Alos-PalSAR DEM, which has 12.5 m of spatial resolution. For LULC classification was used a Random Forest classifier, which requires the definition of two parameters: the number of classification trees (Ntree) and the number of prediction variables (Mtry). In the present study, we used Ntree = 500 and Mtry = 1. The LULC classes analyzed were: Agriculture (AG), Primary Forest (PF), Secondary Succession (SS) and Grassland (GR). Field samples collected in September 2017 were used to validate the results by means of confusion matrix and the Kappa index. We observed that the use of only H/Alpha decomposition showed a global accuracy of 42.1 %, with a Kappa index = 0.17. Analyzing the user's (UA) and producer's accuracies (PA), we noticed that AG class presented the better results, with 54.2 % of PA and 48.4 % of UA. Alternatively, FP and GR classes achieved similar results, with 39.8 % and 38.3 % of UA and 40.6 % and 36.3 % of PA, respectively. The Secondary Succession (SS) class showed the lowest values for UA and PA, with 25.2% and 16.2 %, respectively. We noticed a great confusion between AG and FP classes. This low global accuracy probably is related to the satellite operation band and dual-polarization available, which limits the classification process. In addition, the use of only H/Alpha attributes brought little information to the classifier to influence this result. Other studies in the Amazon rainforest also showed this limitation of the C-band for LULC mapping, mainly in comparison to the L-band.