

A COMPARATIVE STUDY OF ALOS-2 PALSAR AND LANDSAT-8 IMAGERY FOR LAND COVER CLASSIFICATION USING MAXIMUM LIKELIHOOD CLASSIFIER

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Abstract

This study examines ALOS-2 PALSAR L-band dual-polarization (HH and HV) SAR data and Landsat-8 optical imagery for land cover classification. The SAR data has been preprocessed first, which included radiometric calibration, geocoding, and speckle filtering. The HH/HV band ratio has been used to create the third band, and thus a synthetic RGB SAR image was created. The Landsat-8 data was also preprocessed for the classification process. For land cover classification of both SAR and optical datasets, the supervised maximum likelihood classifier was used. Training samples were selected from the Landsat-8 optical imagery with the support of information available in Google Earth; the same pixel locations of training data were used to extract training data from SAR image as well. The Landsat-8 optical imagery was classified and also used for visual assessment of the SAR land cover classification results. Accuracy assessment has been done for both the results of SAR and Landsat-8 data. The SAR classified output gives accuracy of 93.15% and the Landsat-8 classified map accuracy was 91.34 %, while the Kappa coefficient for SAR and Landsat-8 classified images is 0.92 and 0.89, respectively. Classification limitations exist in some cases, such as roads being merged in vegetation areas and some of the barren land is merged in settlements. The land cover classification can be expected to be further improved using polarimetric decomposition methods and fusion of SAR data with optical data.