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Comparison of different object-based classifications in LandsatTM images for the analysis of heterogeneous landscapes

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Abstract: This study evaluates an optimal methodology for classification using object-based analysis on medium resolution images (LandsatTM), especially in areas with heterogeneous landscapes. The selected study area is the Province of Pontevedra in Spain, which has a complex landscape with different coexisting elements, such as mixed, hardwood and coniferous forests, scrublands, natural grassland, agricultural areas, water surfaces, bare soils as well as urban and industrial areas. Different segmentation configurations were tested for two different classifiers: K-Nearest Neighbors (KNN) and Support Vector Machine (SVM). For validation, the results were compared with a map of land use and land cover corresponding to the European project CLC-2006 through the analysis of both Kappa coefficient and error matrix. The best results were obtained for a SVM classification with level 30 and merge 97, resulting in a Kappa coefficient of 0.80 and error matrix of 85.31%. Additionally, different landscape metrics defining the structure and configuration of the landscape were evaluated for each classification.

Keywords: remote sensing; land use; OBIA; KNN; SVM; Kappa coefficient.

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