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Object-Based Classification of Multi-temporal Images for Agricultural Crop Mapping in Karacabey Plain, Turkey

A. Ozdarici-Ok[1] and Z. Akyurek[2]

[1]Nevsehir H.B.V. University, Dept. of Geodesy and Photogrametry Engineering, 50300 Nevsehir, Turkey
[2]Middle East Technical University, Dept. of Civil Engineering, 06800 Ankara, Turkey

Abstract. The objective of this research is to classify major crop types cultivated in Karacabey Plain of north western Turkey using multitemporal Kompsat-2 and Envisat ASAR data with an object-based methodology. First a pansharpening algorithm is applied to each panchromatic and multispectral Kompsat-2 data to produce colour images having 1m spatial resolution. Next, Mean-Shift image segmentation procedure is applied to the pansharpened Kompsat-2 data with multiple parameter combinations. Multiple goodness measures are utilized to evaluate the object-based results. The optimum objects are then employed in object-based classifications of the single-date images. Next, single-date multispectral (MS) Kompsat-2 images and Kompsat-2 images along with the Envisat ASAR data are classified with the Support Vector Machines (SVMs) method. The training samples are provided automatically by the selected objects based on spatial statistical properties. Next, probability maps are generated for each image in pixel-based manner during the image classification operations. The maximum probabilities are then assigned to the pixels as class labels and the combined thematic maps (June-July, June-August, June-July-August) are generated in pixel-based and object-based manners. The produced thematic maps are evaluated through the confusion matrices and compared also with the results of parcel-based classifications using original agricultural parcels. Results indicate that the combined thematic maps of June-August and June-July- August provide the highest overall accuracy and kappa value approximately 92 % and 0.90, respectively.

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