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Analysing Temporal Effects on Classification of SAR and Optical Images

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Obtaining high accuracy in land cover classification is a non-trivial problem in geosciences for monitoring urban and rural areas. In this study, different classification algorithms were tested with different types of data, and besides the effects of seasonal changes on these classification algorithms and the evaluation of the data used are investigated. In addition, the effect of increasing classification training samples on classification accuracy has been revealed as a result of the study. Sentinel-1 Synthetic Aperture Radar (SAR) images and Sentinel-2 multispectral optical images were used as datasets. Object-based approach was used for the classification of various fused image combinations. The classification algorithms Support Vector Machines (SVM), Random Forest (RF) and K-Nearest Neighborhood (kNN) methods were used for this process. In addition, Normalized Difference Vegetation Index (NDVI) was examined separately to define the exact contribution to the classification accuracy. As a result, the overall accuracies were compared by classifying the fused data generated by combining optical and SAR images. It has been determined that the increase in the number of training samples improve the classification accuracy. Moreover, it was determined that the object-based classification obtained from single SAR imagery produced the lowest classification accuracy among the used different dataset combinations in this study. In addition, it has been shown that NDVI data does not increase the accuracy of the classification in the winter season as the trees shed their leaves due to climate conditions.