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Estimating Tea Plantation Area Based on Multi-source Satellite Data

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Abstract

Tea is a characteristic cash crop native to China, mainly distributed in the south of the Yangtze River. Estimating the planting area and spatial distribution of tea gardens is of great significance to improve the economic and ecological benefits of tea. In this paper, a method for extracting tea plantation area based on multi-source remote sensing satellite data was proposed. We collected the Landsat 8 OLI, Sentinel-2, HJ-1A/B, and GF-1 WFV data from 2017 to 2018 in Huzhou City, China. After data pre-processing, we calculated the Normalized Difference Vegetation Index (NDVI) and spectral characteristics of each dataset. We also obtained Gabor textual features of each dataset using principal component analysis (PCA). In order to obtain the time-series data, all features of Sentinel-2, HJ-1A/B, and GF-1 WFV data were relatively calibrated to Landsat 8 OLI data. Finally, the area of tea garden of Huzhou City, Zhejiang Province was extracted from each dataset using support vector machine (SVM) classifier. The area is 235.68 km² and has been verified by data from field survey and Google Earth. The results show that this method can achieve high estimating precision for tea garden area estimation, which is of great significance for further application.