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crops planting area identification and analysis based on multi-source high resolution remote sensing data

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Crop planting structure is of great significance to the quantitative management of agricultural water and the accurate estimation of crop yield. With the increasing spatial and temporal resolution of remote sensing optical and SAR(Synthetic Aperture Radar) images, efficient crop mapping in large area becomes possible and the accuracy is improved. In this study, Qingyijiang Irrigation District in southwest of China is selected for crop identification methods comparison, which has heterogeneous terrain and complex crop structure . Multi-temporal optical (Sentinel-2) and SAR (Sentinel-1) data were used to calculate NDVI and backscattering coefficient as the main classification indexes. The multi-spectral and SAR data showed significant change in different stages of the whole crop growth period and varied with different crop types. Spatial distribution and texture analysis was also made. Classification using different combinations of indexes were performed using neural network, support vector machine and random forest method. The results showed that, the use of multi-temporal optical data and SAR data in the key growing periods of main crops can both provide satisfactory classification accuracy. The overall classification accuracy was greater than 82% and Kappa coefficient was greater than 0.8. SAR data has high accuracy and much potential in rice identification. However optical data had more accuracy in upland crops classification. In addition, the classification accuracy can be effectively improved by combination of classification indexes from optical and SAR data, the overall accuracy was up to 91.47%. The random forest method was superior to the other two methods in terms of the overall accuracy and the kappa coefficient.