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Detection of long duration cloud contamination in hyper-temporal NDVI imagery

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Abstract

NDVI time series imagery are commonly used as a reliable source for land use and land cover mapping and monitoring. However long duration cloud can significantly influence its precision in areas where persistent clouds prevails. Therefore quantifying errors related to cloud contamination are essential for accurate land cover mapping and monitoring. This study aims to detect long duration cloud contamination in hyper-temporal NDVI imagery based land cover mapping and monitoring. MODIS-Terra NDVI imagery (250 m; 16-day; Feb'03-Dec'09) were used after necessary pre-processing using quality flags and upper envelope filter (ASAVOGOL). Subsequently stacked MODIS-Terra NDVI image (161 layers) was classified for 10 to 100 clusters using ISODATA. After classifications, 97 clusters image was selected as best classified with the help of divergence statistics. To detect long duration cloud contamination, mean NDVI class profiles of 97 clusters image was analyzed for temporal artifacts. Results showed that long duration clouds affect the normal temporal progression of NDVI and caused anomalies. Out of total 97 clusters, 32 clusters were found with cloud contamination. Cloud contamination was found more prominent in areas where high rainfall occurs. This study can help to stop error propagation in regional land cover mapping and monitoring, caused by long duration cloud contamination.