Fusing Landsat NDVI and PALSAR backscatter time-series data for detecting deforestation in the tropics

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ABSTRACT

We present a novel pixel based multi-sensor time-series fusion approach (MulTiFuse; Reiche et al., accepted), that adresses the need for a multi-sensor fusion method that fully exploit the observation density of medium resolution optical and SAR time series for detecting forest change. We apply the approach to univariate Landsat NDVI and ALOS PALSAR FBD time series data and utilise the fused time series in a change detection framework to detect deforestation (logging). Deforestation is detected, using the BFASTmonitor algorithm (Verbesselt et al. 2012). Deforestation is validated with quarterly period (3-montly) reference data of a managed tropical forest site. The high temporal resolution of the refernece data allowed an detailed validation of the spatial and temporal accuracy of detected changes. We found an strong increase of the spatial and temporal accuracy obtained for the fused NDVI-PALSAR time series compared to the NDVI- and PALSAR-only approach. We furthermore address the problem of reduced optical data density in tropical regions due to persistent cloud cover by validating our methods for increaseing optical missing data percentages.

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