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TOWARDS FOREST CHANGE TRACKING USING SENTINEL 1, 2 AND 3 SATELLITES

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ABSTRACT:
Remote sensing data play an important role in the monitoring of forest changes. Methods are needed to provide objective estimates of forest loss to support monitoring efforts at various scales, and with the advent of the Sentinel 1, 2 and 3 satellites, detailed and accurate forest disturbance monitoring at regular time scales is becoming possible. While several time series based change monitoring methods have recently been described in the literature, there are few studies that focus on tropical forest areas, where low data availability, drought effects and complex change processes present challenges to forest disturbance monitoring.
Here, we present three case studies that illustrate the potential of high spatial and temporal resolution offered by S1, S2 and S3 to track deforestation and degradation in the tropics. First, a robust data-driven method to track deforestation and degradation based on Landsat time series is demonstrated. We show that small-scale forest disturbances can be detected at regular time scales in an Afromontane forest system in southern Ethiopia. Second, an approach for exploiting multiple data streams from MODIS and Landsat is presented to deal with strong natural variability that often occurs in dry tropical forest areas. We illustrate that local forest disturbances can be differentiated from more regional climatic variability by combining Landsat and MODIS data for a dry tropical forest area in lowland Bolivia. Third, Landsat and ALOS PALSAR L-band SAR time series are fused to better deal with frequent cloud cover. We demonstrate that the spatial and temporal accuracy improves when combining PALSAR and Landsat data for detecting deforestation under different cloud cover intensity scenarios for a study area in Fiji. These three cases illustrate the need to move towards a non-sensor specific approach that is able to handle multi-data streams at once for monitoring forest disturbances.

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