

Vortrag

Characterizing post-deforestation land use intensity in the Brazilian Amazon using dense Landsat time series

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The high demand for agricultural land is the main driver of deforestation in the Brazilian Amazon and causes substantial losses of a unique biodiversity and severe emissions of greenhouse gases. Sustainable intensification of cropping and livestock production systems is seen as a potential way to reduce the demand for new land and thereby the Brazilian GHG emissions. Intensification is mainly achieved by shifting from traditional and extensive, mostly fire based management practices towards advanced tillage systems and integrated crop- and grazing rotations. Deeper knowledge on post-deforestation land use intensity is hence needed to evaluate how management policies influence land use and related GHG emissions.

Our study area is the region of Novo Progresso, Pará, Brazil, a hot-spot of deforestation where most of the deforested land is converted to grazing land. Remote-sensing based studies on spatio-temporal patterns of such pasture dominated areas are rare, not the least because the scarce frequency of none-clouded observations is challenging. To better address this knowledge gap, we developed the Clear Observation Sequence (COS) approach (Jakimow et al. 2018. Remote Sens Environ) to map fire and tillage from a Landsat (7+8) time series. Both management practices are important indicators of agricultural activity, but often become visible for a short period only. The COS approach fully exploits a dense Landsat time series and derive annual maps of land management based on Random Forest class probability margins.

The selection of reference samples and the final map validation required to explore the entire Landsat time-series as well as selected VHR image to verify the occurrence or absence of a specific land cover and land management. This became to challenging with standard GIS / Digital Imaging Software, so we developed the EO Time Series Viewer, an official QGIS Plugin to support the interactive visualization (<https://plugins.qgis.org/plugins/timeseriesviewerplugin>).