



## Forest disturbances detection in Vietnam, Cambodia and Laos using Sentinel-1 data

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Over the last 25 years, the world's forests have undergone substantial changes. Deforestation and forest degradation in particular contribute greatly to biodiversity loss through habitat destruction, soil erosion, terrestrial water cycle disturbances and anthropogenic CO<sub>2</sub> emissions. In certain regions and countries, the changes have been more rapid, which is the case in the Greater Mekong sub-region recognized as deforestation hotspot (FAO, 2020). In this region, illegal and unsustainable logging and conversion of forests for agriculture, construction of dams and infrastructure are the direct causes of deforestation. Effective tools are therefore urgently needed to survey illegal logging operations which cause widespread concern in the region.

Monitoring systems based on optical data, such as the UMD/GLAD Deforestation alerts implemented on the Global Forest Watch platform, are limited by the important cloud cover which causes delays in the detections. However, it has been demonstrated in the last few years that forest losses can be timely monitored using dense time series of (synthetic aperture) radar data acquired by Sentinel-1 satellites, developed in the frame of the European Union's Earth observation Copernicus programme. Ballère et al. (2021) showed for example that 80% of the forest losses due to gold mining in French Guiana are detected first by Sentinel-1-based forest loss detection methods compared with optical-based methods, sometimes by several months. Methods based on Sentinel-1 have been successfully applied at the local scale (Bouvet et al., 2018, Reiche et al., 2018) and can be adapted and tested at the national scale (Ballère et al., 2020).

We show here the main results of the SOFT project funded by ESA in the frame of the EO Science for Society open calls. The overall SOFT project goal is to provide validated forest loss maps every month over Vietnam, Cambodia and Laos with a minimum mapping unit of 0.04 ha, using Sentinel-1 data. The results confirm the analysis of the deforestation fronts published recently by the WWF (Pacheco et al., 2021), showing that Eastern Cambodia, and Southern and Northern Laos are currently forest disturbances hotspots.

References:

Ballère et al., (2021). SAR data for tropical forest disturbance alerts in French Guiana: Benefit over optical imagery. *Remote Sensing of Environment*, 252, 112159.

Bouvet et al., (2018). Use of the SAR shadowing effect for deforestation detection with Sentinel-1 time series. *Remote Sensing*, 10(8), 1250.

FAO. Global Forest Resources Assessment; Technical Report; Food and Agriculture Association of the United-States: Rome, Italy, 2020.

Pacheco et al., 2021. Deforestation fronts: Drivers and responses in a changing world. WWF, Gland, Switzerland

Reiche et al., (2018). Improving near-real time deforestation monitoring in tropical dry forests by combining dense Sentinel-1 time series with Landsat and ALOS-2 PALSAR-2. *Remote Sensing of Environment*, 204, 147-161.