



THE UNIVERSITY OF EDINBURGH

Knowledge Together Partnership

for monitoring woody biomass (change) in woodland ecosystems

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RADAR Remote Sensing

- Active 90 systems (e.g. RADARS) offer cloud-free imagery and have day-on-night acquisition capability
- Long wavelength RADAR systems measure backscatter, a good indicator of forest carbon stock
- RADAR systems provide an alternative solution over optical systems (e.g. Landsat) to detect forest degradation

LTS International

LTS supports sustainable development in the areas of climate change, forestry and REDD, land use, and water resource management

Case Studies

Deforestation & Degradation
To identify effects of deforestation and forest degradation in the Middle Shore river in Southern Malawi

Parameterisation analysis
To determine the impact of canopy density on forest biomass to calibrate RADAR data

Processing Chain

The FORIST is implemented through the creation of a processing chain that includes:
- Terrain correction to account for terrain effects on geometric properties of radar data
- Storage, Averaging and Masking: to produce a mean-reduced year-average product of the backscatter values

Parameterisation analysis

Radar data are collected with four different polarisations (HH, HV, VH, VV) and different incidence angles. The study also incorporates rugged terrain data collected in Malawi to calibrate the original parameter settings of the FORIST tool (see Table 1)

Deforestation & Degradation

Due to emissions trends (higher and low-density woodlands) between the study site (Southern Malawi) and the calibration site (Central Mozambique), the original parameter settings of the FORIST tool (see Table 1)

Assessment Tool

Aperture: 100m
Resolution: 10m
Swath: 200m
Range: 100km
Frequency: 1.25GHz

Field Inventory

An inventory of ninety-six plots was used to calibrate RADAR data. Plots were ranging between 0.1 to 2.2 ha (mean 1.0, dev. = 0.63), within an area of 1,168km² located in central Mozambique (5)

Major Findings

Per pixel biomass changes of 12 MgC ha⁻¹ were detected with 95% confidence. Although associated with high uncertainty, degradation was estimated to contribute up to 67% of the net loss of biomass

Results and Discussion

Deforestation & Degradation

Figure 1 distinguishes between deforestation and degradation which accounted for more than 50% of the total biomass loss on average. Across the five sites, about 40% of the total biomass lost in 2007 is degraded in 2010 (Table 1). Selective logging and small-scale cultivation has been identified as main causes of biomass loss.



Site ID	Site Name	Area (ha)	Biomass Loss (MgC ha ⁻¹)	Deforestation (%)	Degradation (%)
01
02
03
04
05

The findings of this study

The findings of this study are that...

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