ALOS

K&C Initiative

An international science collaboration led by JAXA

Project Objective

- Development of forest and biomass mapping methods
- Estimation of carbon sources and sinks from deforestation and regrowth

Forest and biomass mapping using ALOS-PALSAR

Estimation of changes in forest cover and in biomass of forest regrowth

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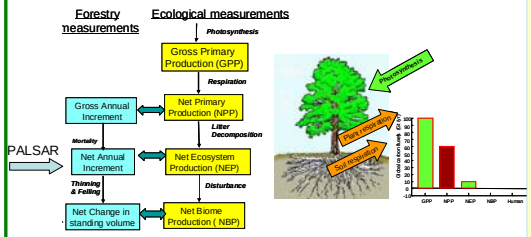
Rationale

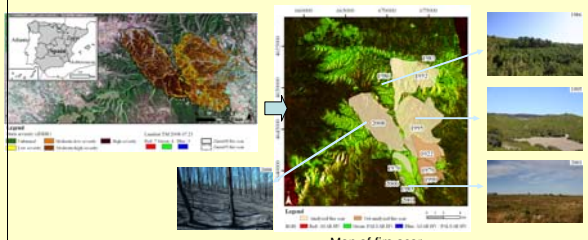
❑ The increment in biomass is spatially variable -regrowth after disturbances (logging, fire) depends on climate, soil, history
-Increase in biomass of reforestation and plantation depends in addition on species and cultural practices
❑ Can ALOS PALSAR monitor increase of biomass in early growth phase ?
❑ Measurements of increment in forest biomass in early growth phase is essential in the assessment of the carbon budget (contribution to the carbon sinks)



Summary

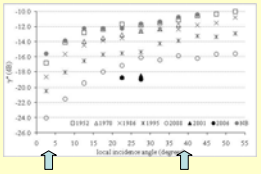
Changes in biomass in forest regrowth after fire and logging, and increment in biomass in intensive tree plantation have been assessed using PALSAR data at three different places.
➢ It is possible to detect different stages of regrowth at time interval depending on the site,
➢ The biomass increment still needs to be quantified,
➢ Passes of PALSAR during its lifetime are required to study biomass increment by regions.

Biomass recovery after fire

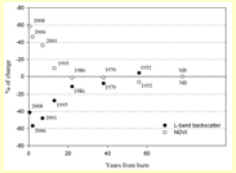


Map of fire scar

Changes in forest backscatter with age after fire



8 dB in flat terrain (Δ biomass→90 t/ha)

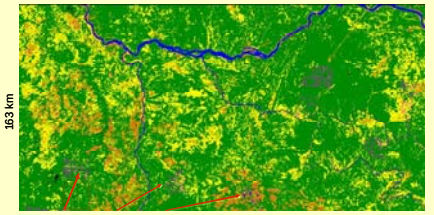


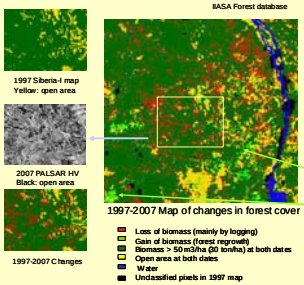
5-6 dB on slope

Summary
➢ Increase in biomass after fire is spatially variable (depending on severity of fire, topography, exposition, soil)
➢ It is possible to distinguish 3 regrowth stages during the first 20 years after fires
➢ Increase in biomass to be further quantified (in situ measurements)

Forest regrowth after logging and fires

ALOS PALSAR mapping of forest biomass (growing stock volume) in 2007, Krasnoyarsk, Siberia





1997-2007 Map of changes in forest cover

Percentage of area with 1997-2007 increase in biomass: 3.2%

Regrowth after logging

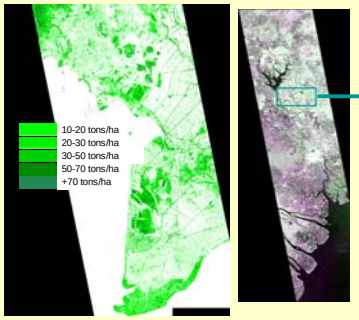
Regrowth after fire?

Summary
➢ It is possible to detect 10 year regrowth in Siberia
➢ Increase in biomass is mainly from changes in 'smooth' area to class of biomass < 30 t/ha
➢ Knowledge of year of fire and logging required for annual increment in biomass

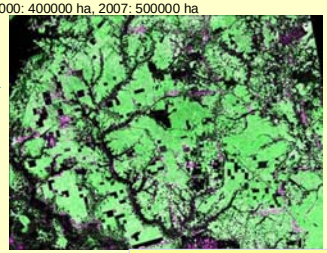
Increase in biomass in forest plantation / reforestation

South Vietnam

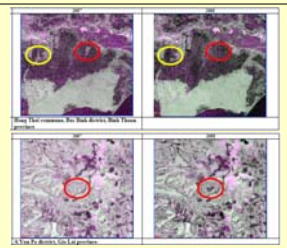
Biomass map from PALSAR HV - 2007



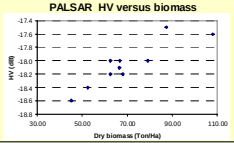
Extensive rubber plantation program: 1975: 75000 ha
2000: 400000 ha, 2007: 500000 ha



2007-2008 change in forest cover



PALSAR HV versus biomass

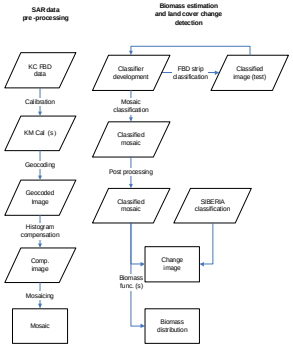


Summary
➢ It is possible to detect annual logging (biomass loss)
➢ Increase in biomass is quantified in reference plots
➢ Mapping of increase in biomass to be done

1. **ALOS PALSAR data** over Siberia, Spain and Vietnam

2.Other data sources
- Siberia 1, forest database
- In situ measurement in Vietnam
- Forest database in Spain

General methodology



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