



# Kyoto and Carbon Initiative

## Forest Theme

# Forest Definition According to the Kyoto Protocol

A minimum area of land of 0.05-1.0 hectares

Tree crown cover, or equivalent stocking level, of more than 10-30 %.

Containing trees with potential to reach a minimum height of 2-5 m at maturity.

Young natural stands, all plantations and harvested areas “temporarily” below the thresholds applied but which are *expected* to grow or revert to forest.

# Kyoto Forest Definitions

Definition optional within the intervals given for minimum area and crown cover, implying that the (remote sensing) observation requirements will vary between countries.

The minimum area specified (0.05-1.0 ha) implies observation at a minimum effective ground resolution requirement of magnitude 20-25 m to 100 m.

# Forest categories

## *Undisturbed forest*

The provision of spatial data on the extent and distribution of different species and types of primary forest is a fundamental requirement for resource inventory (including carbon stocks) and biodiversity assessment.

## *Disturbance, Degradation, Deforestation and Regeneration*

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# Disturbance, Degradation, Deforestation and Regeneration

## *Disturbance*

Disturbance of the canopy of primary forests generally signals the commencement of human utilization of the forest (e.g., harvesting), a natural event (e.g., a fire) or a response to environmental change (e.g., reduced rainfall).

## *Degradation*

If disturbance is continued, short or long term degradation often results. Under extreme circumstances, degradation (e.g., continual burning) may lead to complete removal of the forest.

## *Deforestation*

The conversion of large areas of forest to non-forest; often rapid and complete.

## *Regeneration*

At all levels (disturbance, degradation and deforestation), forests have the inherent capacity to regenerate

# ARD

***Afforestation:*** direct human-induced conversion of land that has not been forested for a period of at least 50 years.

***Reforestation:*** implies conversion of land that once was forested, but that had been converted to non-forested land. For the first commitment period, reforestation activities are limited to reforestation occurring on those lands that did not contain forest on 31 December 1989.

***Deforestation:*** Simply defined as the direct human-induced conversion of “forest” to “non-forest”.

Generally, does not include natural regeneration

A faint world map is visible in the background of the slide, showing the continents in a light blue color against the dark blue background.

# Forest Theme

GROUP I: Land Cover (Forest) Classification

GROUP II: Forest change monitoring (“ARD”)

GROUP III: Biomass and Structure

GROUP IV: Product dissemination?

# Forest Theme: Objectives

## *GROUP 1: Land Cover (Forest) Classification*

Improved maps (location and extent) of land (forest) cover.

## *GROUP 2: Forest change monitoring*

Map forest disturbance, degradation and loss (i.e., deforestation).

Map forest regeneration and relative growth.

(Monitor onset and duration of thawed conditions in boreal regions)

## *GROUP 3: Biomass and Structure*

Estimate above ground biomass of forests (particularly those that are regenerating).

Develop robust techniques for estimation of forest height.



# Products: Land Cover (Forest) Classification

Better knowledge of the type and distribution of actual (as opposed to potential) land cover and monitoring of landcover change improves our knowledge and understanding of the global carbon cycle, biodiversity (habitat type and condition) etc.

GLI data (existing) provides temporal data at 250-1000 m spatial resolution for land cover classification

L-band SAR data useful for detecting the presence or absence of forest cover (land cover) - also change over time (land cover change) – and potentially forest type.

# Products: Forest Change Monitoring

Required to identify and spatially quantify changes in forests (when, where, how much), including forest disturbance, degradation, deforestation and regeneration and associated changes in carbon, diversity etc.

ARD specific to international agreements (particularly the Kyoto Protocol)

L-band SAR is an effective tool for detection and monitoring of deforestation, regrowth and relative growth.

# Products: Biomass and structure

Widespread and objective estimation of biomass provides a basis for estimating carbon stocks (low biomass regeneration or sparse forests) and for improved estimation of sequestration.

L-band SAR with polarization diversity (especially HV polarization) effective for estimating the biomass of forests below 50-100 Mg ha<sup>-1</sup>.

Structural information contained

Interferometric SAR capable of estimating forest height and less sensitive to saturation.

# Proposals: Land Cover Classification

## **GLI Global/Regional Land Cover**

Development of global 250m land cover data using GLI data (*Ryutaro Tateishi*)

## **Regions**

Boreal: SIBERIA and SIBERIA II (*Chris Schmullius*)

Tropical (SE Asia) (*Dirk Hoekman*)



# Proposals: Forest Dynamics and ARD

## Deforestation

Temperate regions (*Shaun Quegan*)

Tropical regions (*INPE, Dirk Hoekman*)

Boreal regions (*Chris Schmillius/Leif Eriksson*)

## Forest Regrowth and Relative Growth

Boreal forests (*Thuy Le Toan*)

Tropical forests, Brazil (*INPE*)

Australian tropical and subtropical woodlands  
(*Richard Lucas, Tony Milne*)

Mangroves, peat swamps, flooded forest (*Various*)

## Forest disturbance

Boreal Regions (*Chris Schmillius*)

# Products: Biomass and Structure

## Biomass

Boreal regions (*Thuy Le Toan, Chris Schmullius*)

Temperate regions (*Shaun Quegan, Thuy Le Toan*)

Subtropical regions, Australia (*Richard Lucas*)

Tropical regions (*Richard Lucas, INPE*)

## Structure (height through interferometry)

Various (*A. Moreira, P. Sequeira, I. Hajnsek*)

# Products

- Stage I: Local area demonstration
- Stage II: Prototype area demonstration
- Stage III: Regional/global implementation

# Requirements of Workshop

- Confirmation of product (Requirement for Group IV: Product Dissemination?)
- Reasons for product (carbon, conventions and/or conservation)
- Optimise coverage of biomes
- Best practice and consistency in implementation (e.g., biomass)
- Collaboration, overlap (e.g., sites, methods) and information exchange
- Available validation data (e.g., for cross checking different products)
- Data requirements (from JAXA)
  - Study areas
  - ALOS sensors
  - Other sensors
- Finalise science plan
  - Key references
- Web sites and other avenues of communication: Information and coordination
- Agreements with JAXA