MORECA

MOnitoring of large scale small holder REforestation projects for CArbon finance mechanisms

Mone Van Geit (WWF), Alix Sotiaux (ULB), Eléonore Wolff (ULB) & Pierre Defourny (UCL)

Eco Makala programme

- Started in 2007. Ongoing
- **Reforestation** of around **5000ha**
- **Surroundings of the ViNP (Eastern DRC)**
- **Small holder** fields **(0,5-5ha)**
- Executed by **WWF Goma** in collaboration with **local associations** and **farmer-planters**
- **Charcoal** provision to the **local population**

Forest Carbon projects

- **Carbon finance mechanisms as A/R CDM and REDD > requirements > user needs**:

  - **Eligibility** of the **lands**: a conclusive proof that the lands were not carrying forest between 1990 till present;
  - **Monitoring** of the **plantations** in terms of **carbon uptake estimates**.

=>Robust forest monitoring system and methodology are a necessity (and are the counter stones of carbon fin. mechanisms)

Objectives

- **Elaboration and validation** of a **methodology** based on **optical and radar** technology in order to:

  - **define the eligibility of lands**
    > forest definition (UNFCCC)
    > ref. year 1990

  - **monitor** a huge number of dispersed **plantations**
    > forest/non-forest
    > carbon uptake estimates

in a cloudy mountainous tropical region

Scientific questions

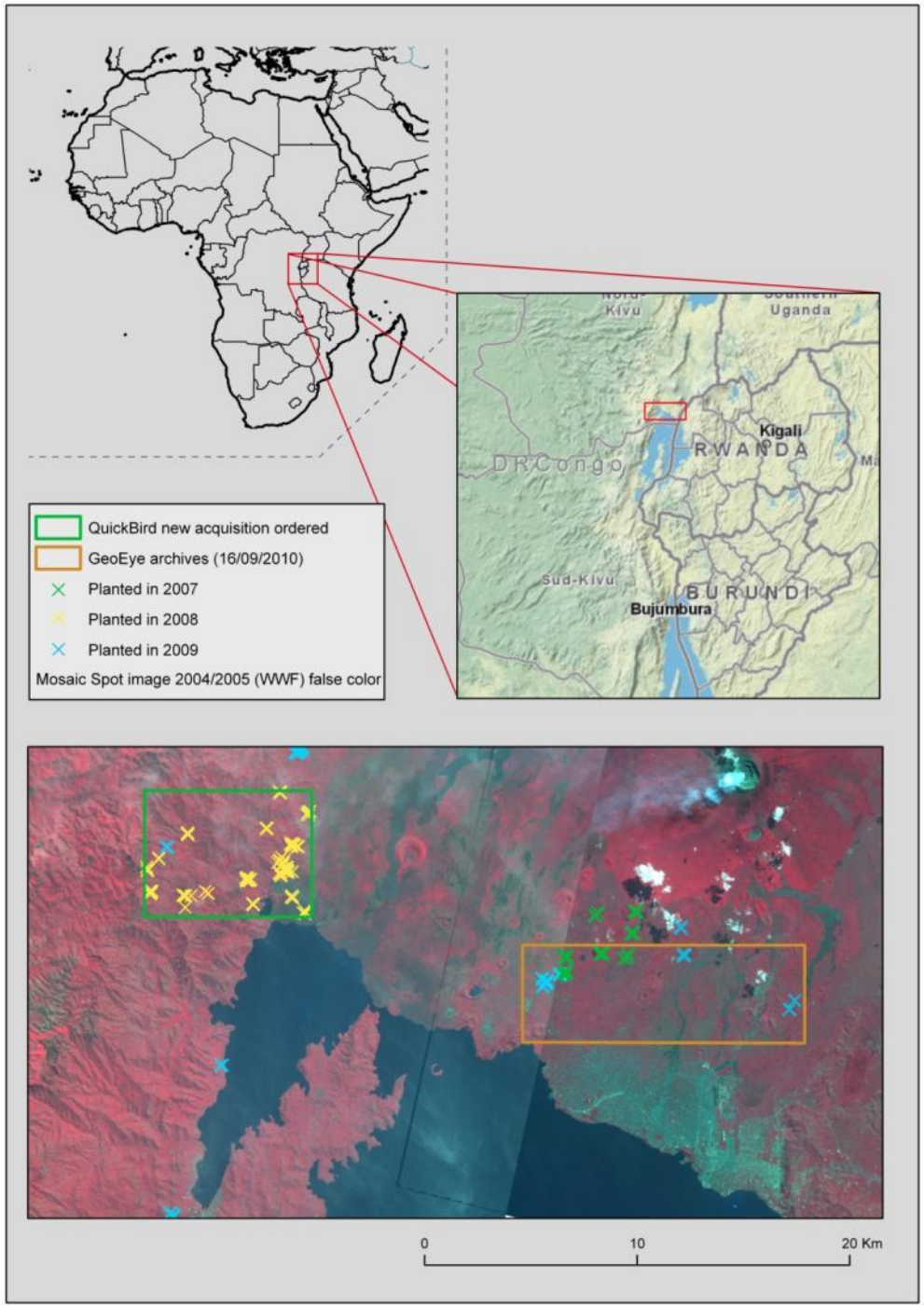
- In the context of a **large scale reforestation** project (> 1000ha) on **dispersed small holder grounds (0.5-5ha)** in a **cloudy and mountainous tropical region**:

  - how to define whether a field parcel with a min. surface of 0.5ha is either a forest or not?

  - how to estimate the carbon stored in a field parcel with a min. surface of 0.5ha that meets the definition of a forest, based on extrapolation of field measurements?

=>Project design and location makes the use of remote sensing particularly relevant

Where?

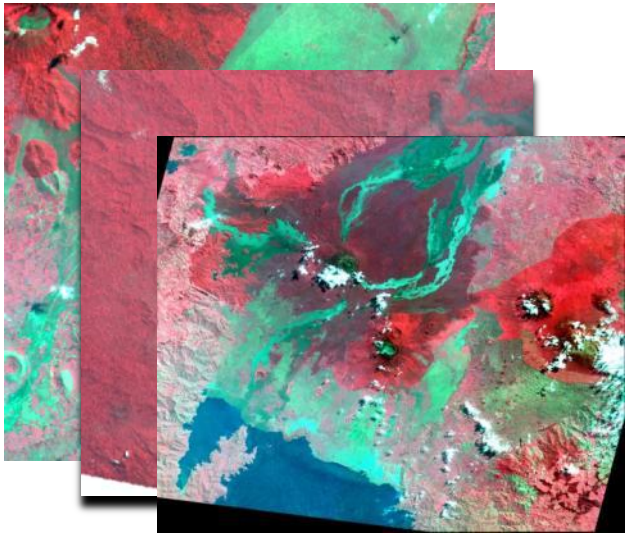

QuickBird new acquisition ordered
GeoEye archives (16/09/2010)
Planted in 2007
Planted in 2008
Planted in 2009
Mosaic Spot image 2004/2005 (WWF) false color
Kivu
Uganda
Kigali
RWANDA
DRCongo
Sud-Kivu
BURUNDI
Bujumbura
0
10
20 Km

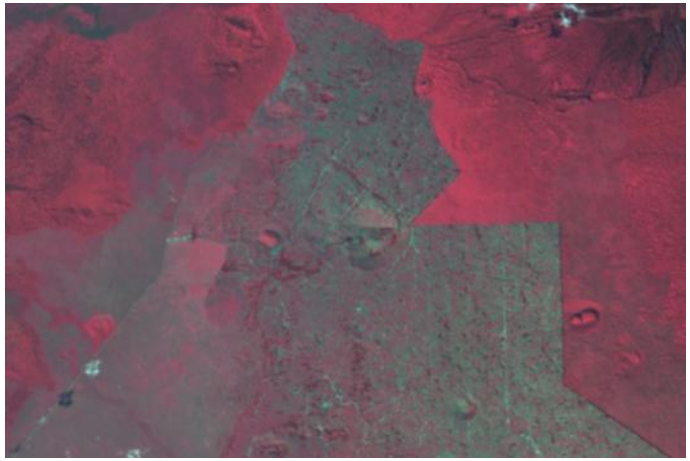
Eligibility map

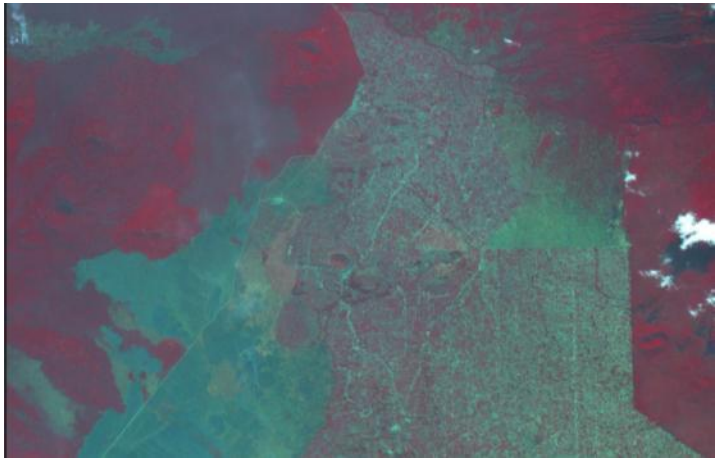
HR (Spot) 1990/1995/2000/2010

- Pre-treatment
- Multi-segmentation
- Classification

→ Eligibility map (not forested since 1990)







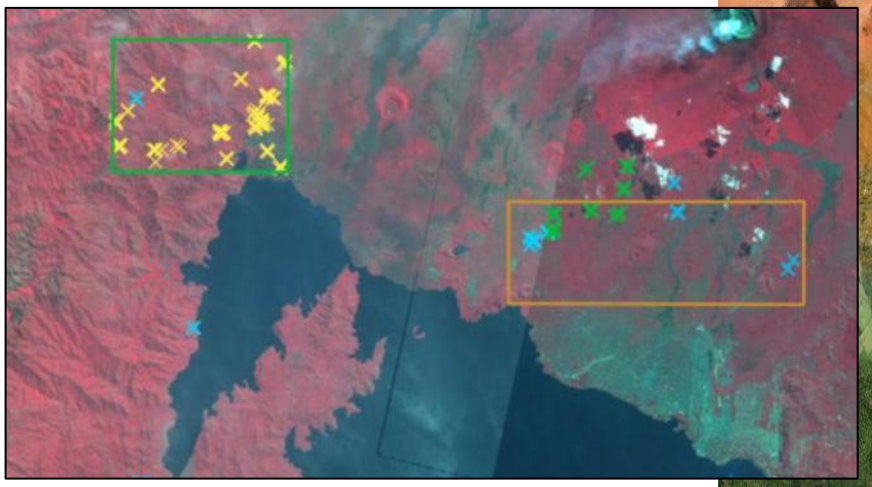
Change between 2004 and 2009 (Spot images Belspo)

Monitoring of plantations

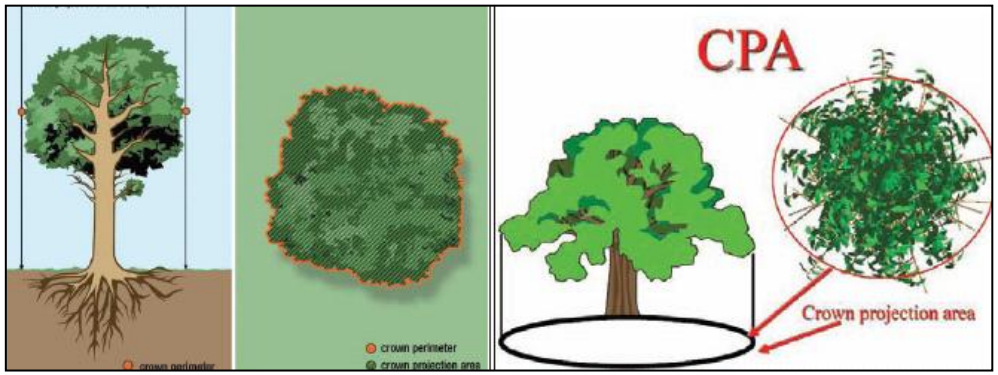
VHR (GeoEye 2010 XS)

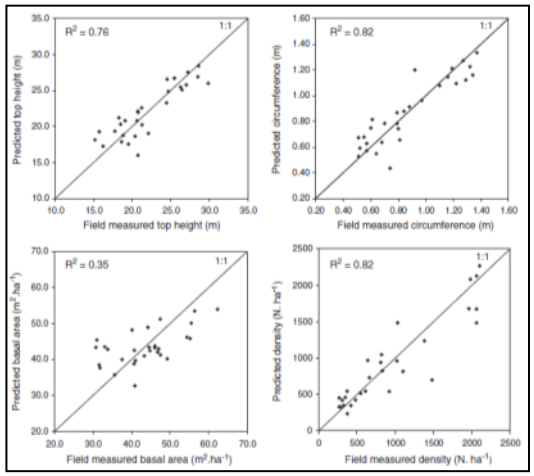
Planted in 2009

Planted in 2007



Biomass estimation





- Establish **empirical relationships** between derived **indices** and **estimates of carbon by multiple regressions** (Foody et al., 2003, Lu, 2005)