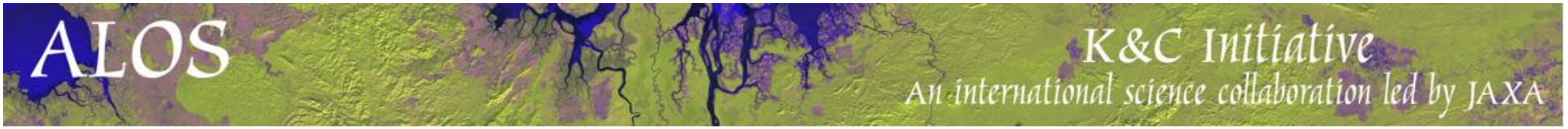


K&C Phase 4 – Status report

TransparentForests

Francesco Holecz – sarmap

Peter Wells – Lutra Consulting

Tim Synnott – FSC Consulting

Charles Eyre – Eyre Consulting

,

Science Team meeting #24
Tokyo, Japan, January 29-31, 2018

Project outline and objectives

The main objectives of this work are:

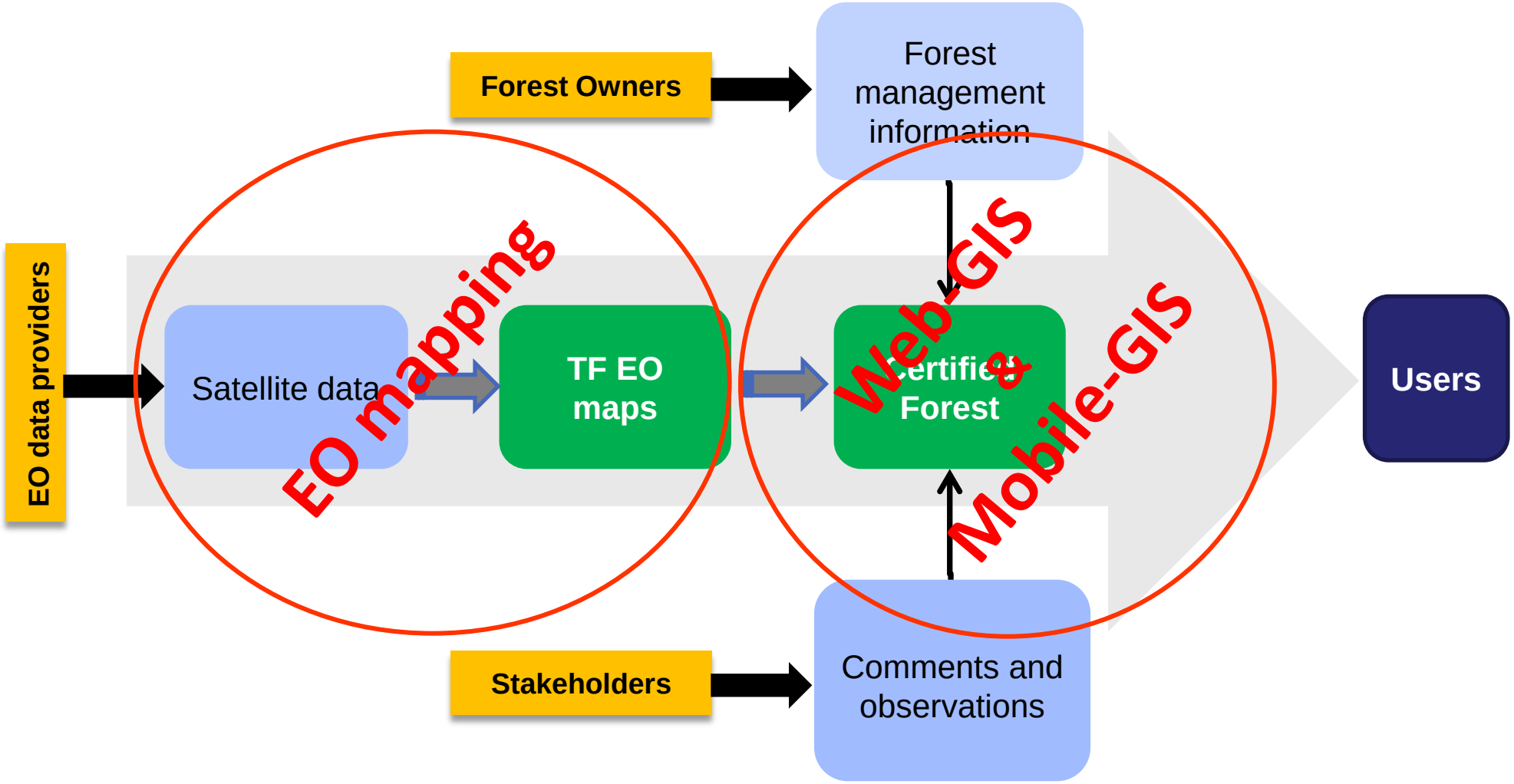
- **Scientific – To demonstrate the benefit of the synergistic use of multi-temporal multi-frequency (SAR in particular) data for forest (certification) purposes in different biomes;**

- **Service – To set up an operational system in primis for forest certification purposes.**

Why TransparentForests?

1. Support to forestry management and audit;
2. Raise quality and reliability of forest audits;
3. Transparency and credibility of certification process;
4. Reduce costs across forest certification.

Service overview



Users

Prime User Group

- Forest Managers
- Certification Bodies
- NGOs
- National Forestry Institutes

Other Users

- Forest verifiers (SGS)
- Accreditation Services International
- Indigenous Peoples and Communities
- Retail sector
- Other stakeholders

Earth Observation component

Thematic product (LCM/LCC)

- Where
- When
- How much
- Type

1. Natural Forest
2. Plantations
3. Scattered trees
4. Clearings
5. Agriculture, grassland
6. Settlements
7. Rivers
8. Wetlands
9. Roads

Biophysical product

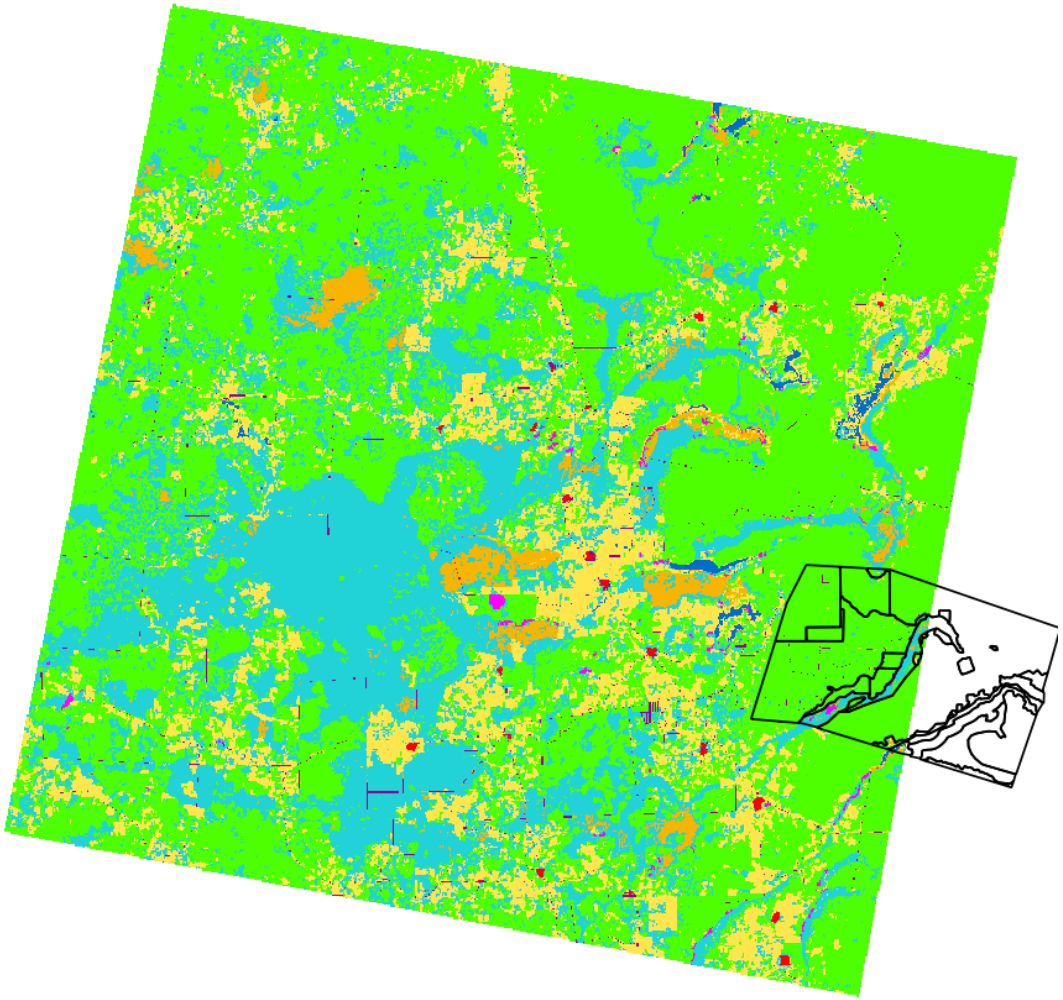
- Timber Volume (in primis in forest plantations)

Digital Surface Model (< 10m)

Demonstration areas

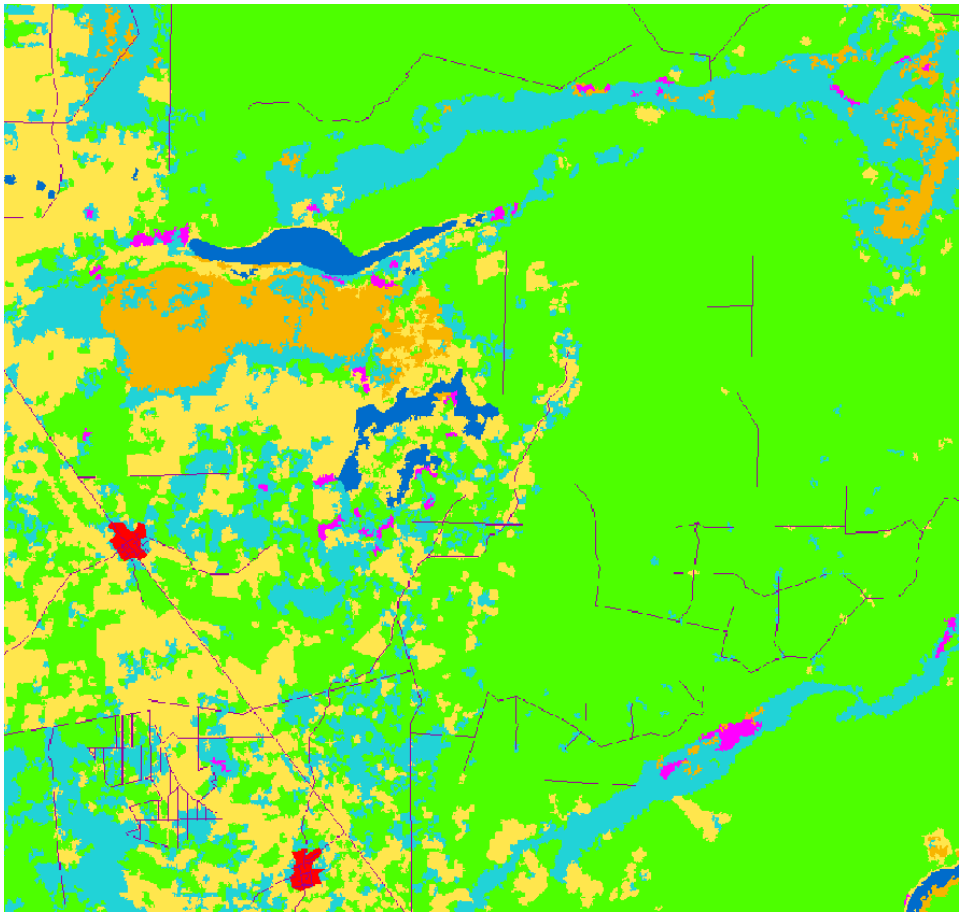
- United Kingdom
- United States
- Mexico
- Russia
- South Africa
- Canada
- Sweden
- Cambodia

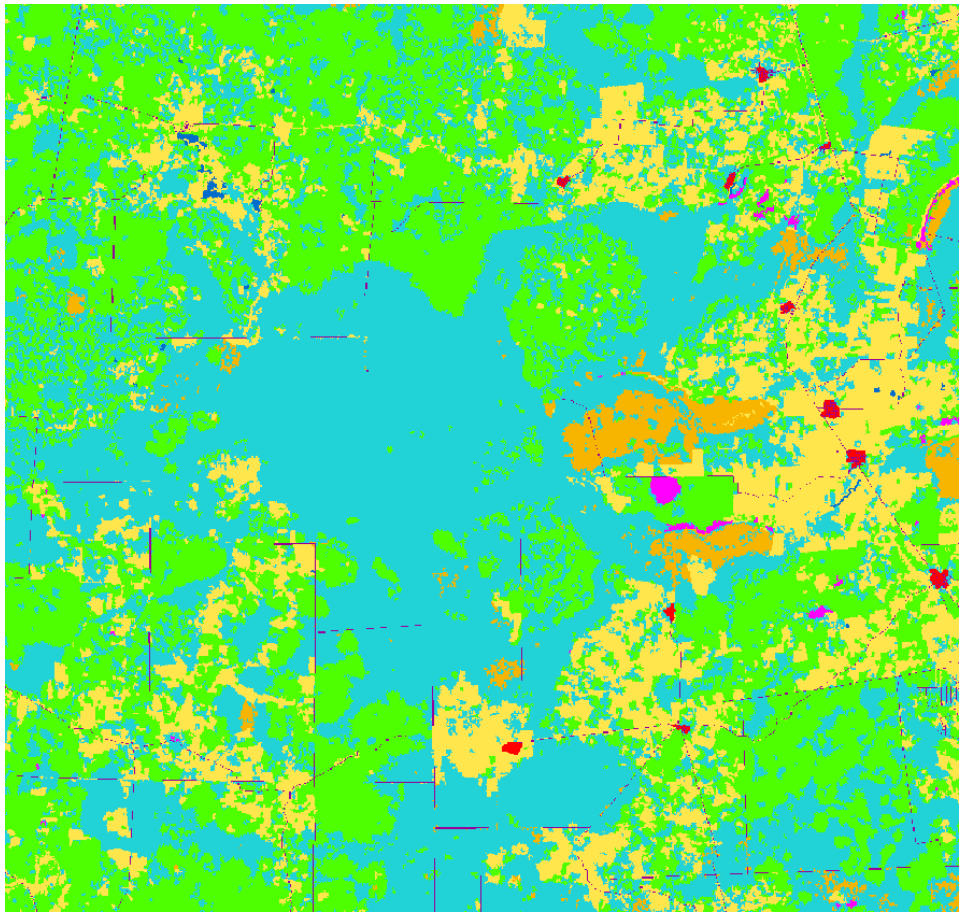
Mexico – LCM based on ALOS-2 InSAR pair



Natural forest
Agriculture, grassland
Settlement
Water
Road
Wet shrubland
Wetlands trees
Swamp forest

Mexico – LCM based on ALOS-2 InSAR pair (detail)

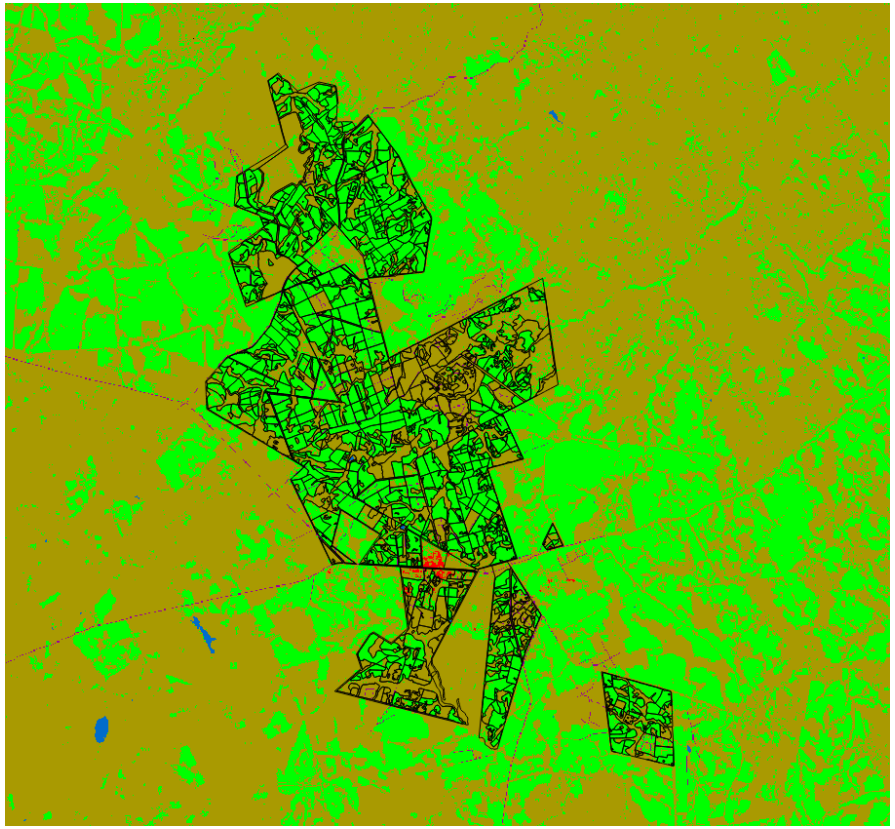




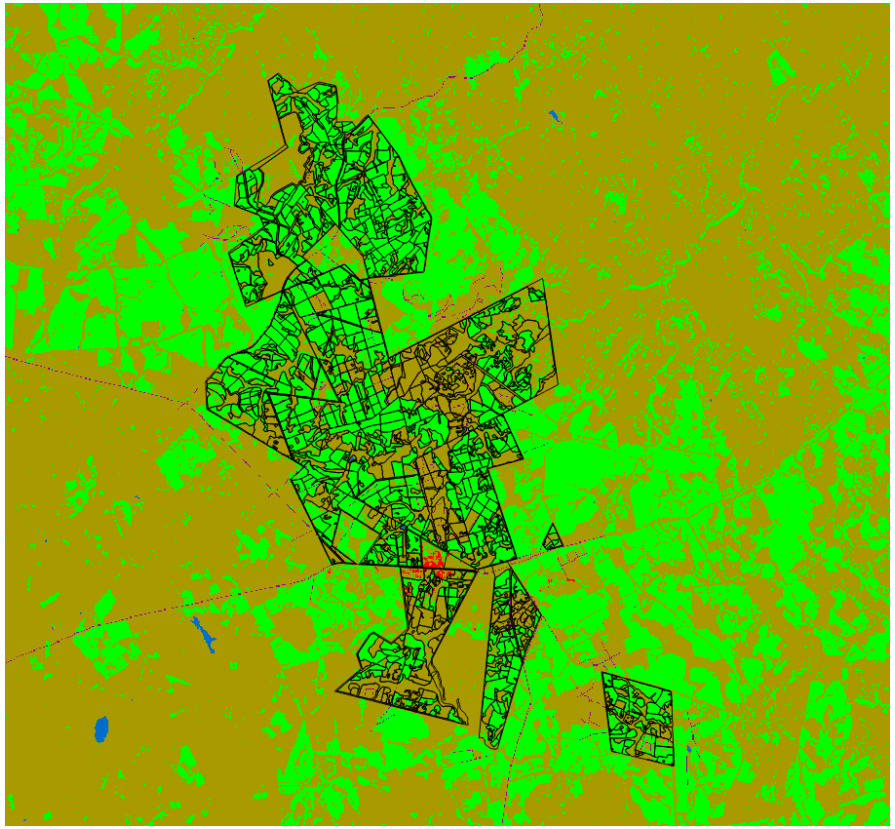
Natural forest Settlement Water Wet shrubland Wetlands
Agriculture, bare soil, grassland Swamp forest Road

South Africa – LCM based on ALOS-2 data (detail)

2015

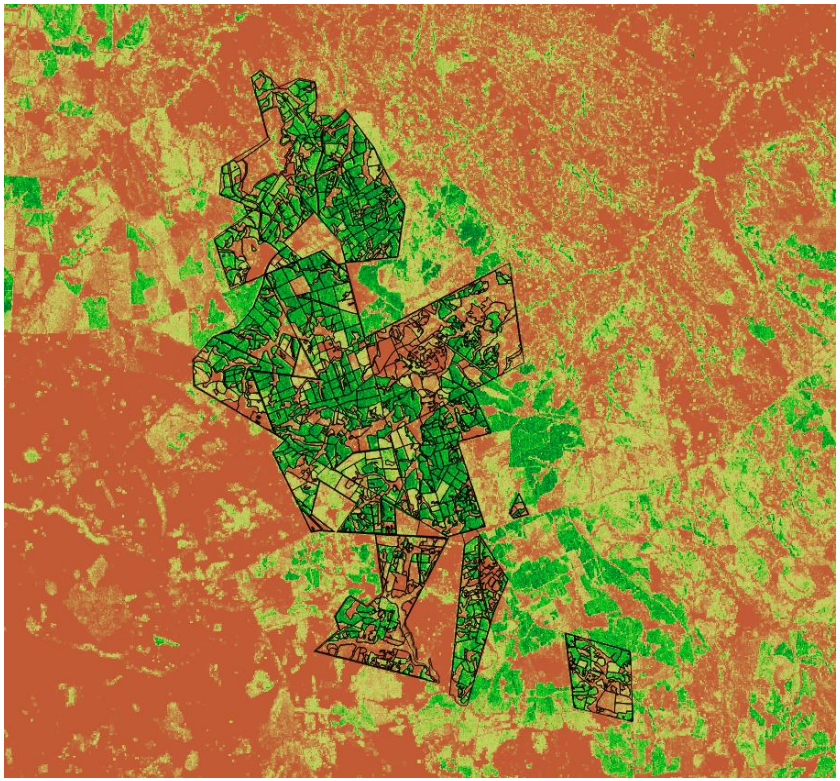


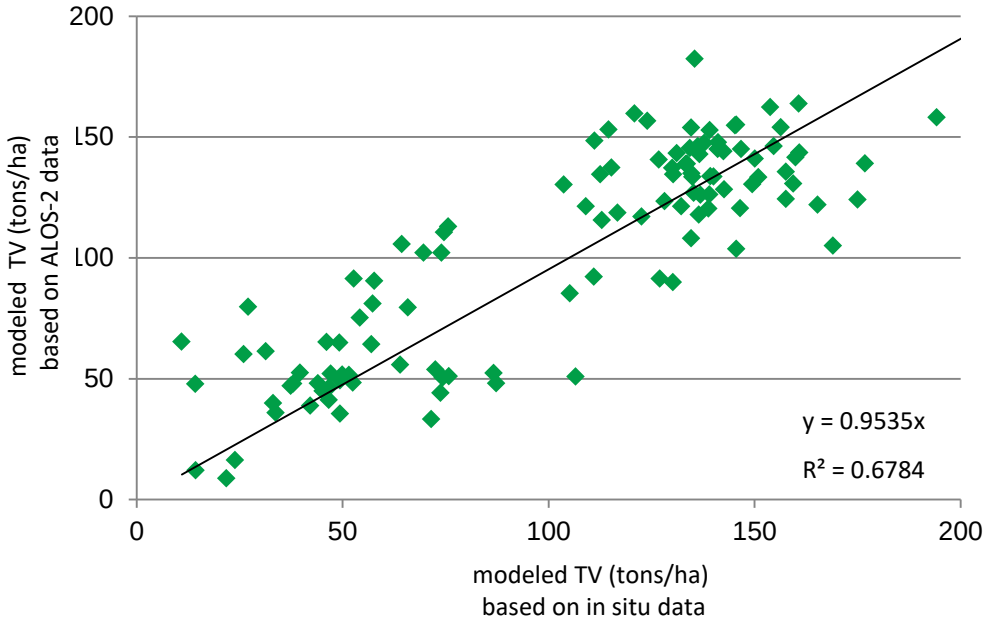
2016



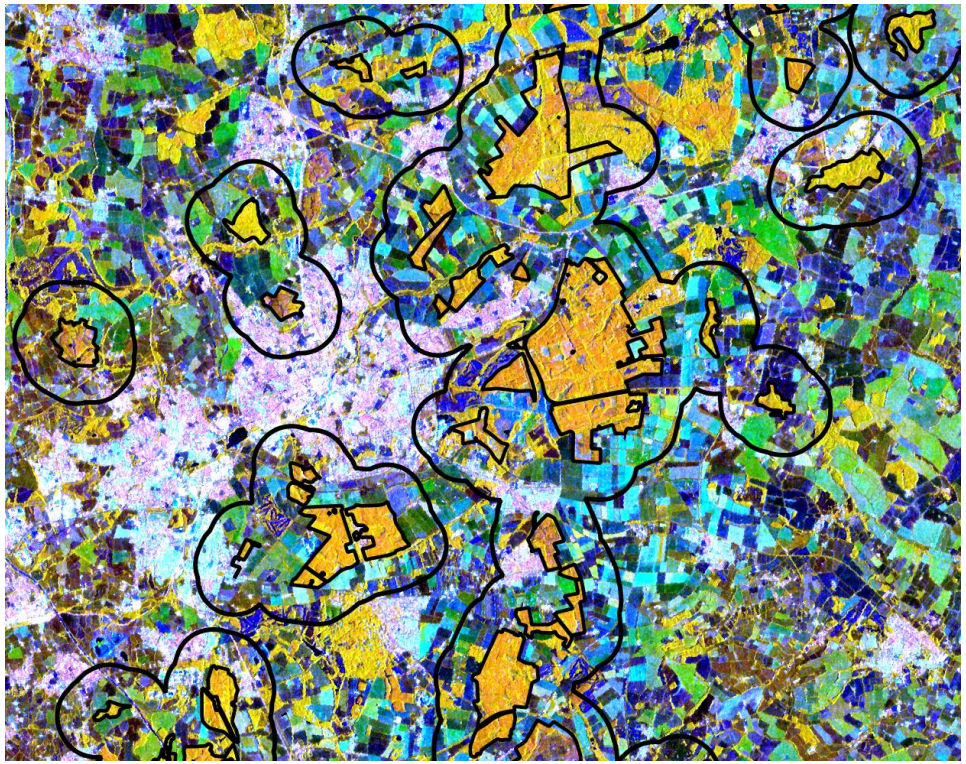
Plantation Bare soil, agriculture, grassland Water Infrastructure Road

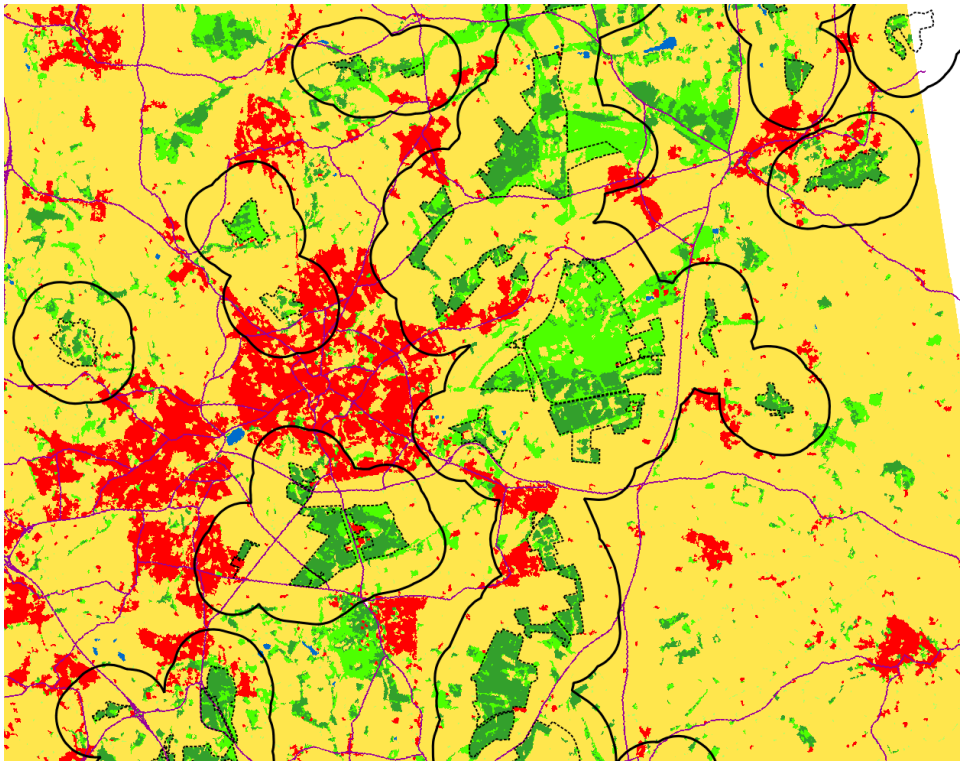
South Africa – LCM based on ALOS-2 data





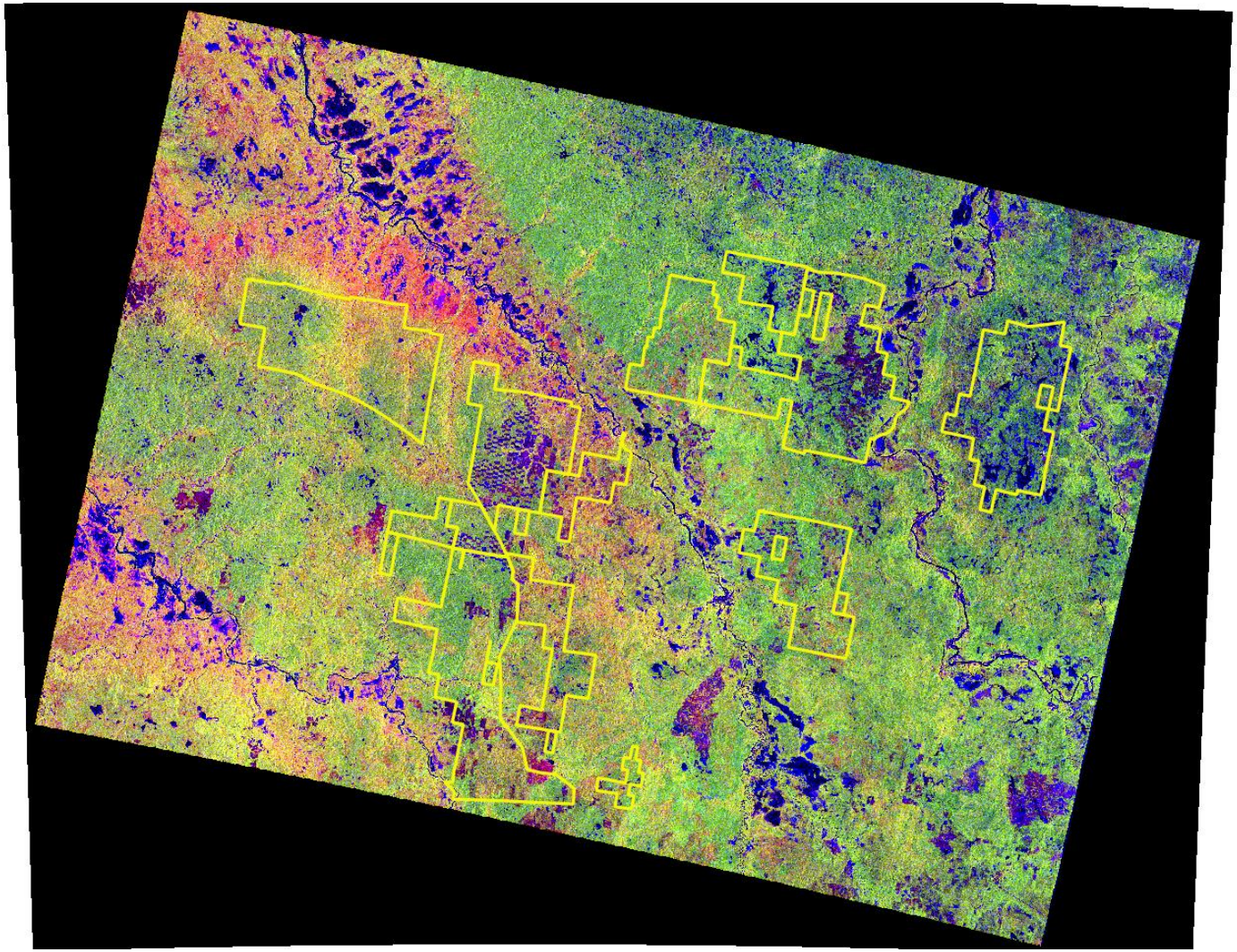
UK – LCM based on ALOS-2 and Sentinel-1 data (detail)



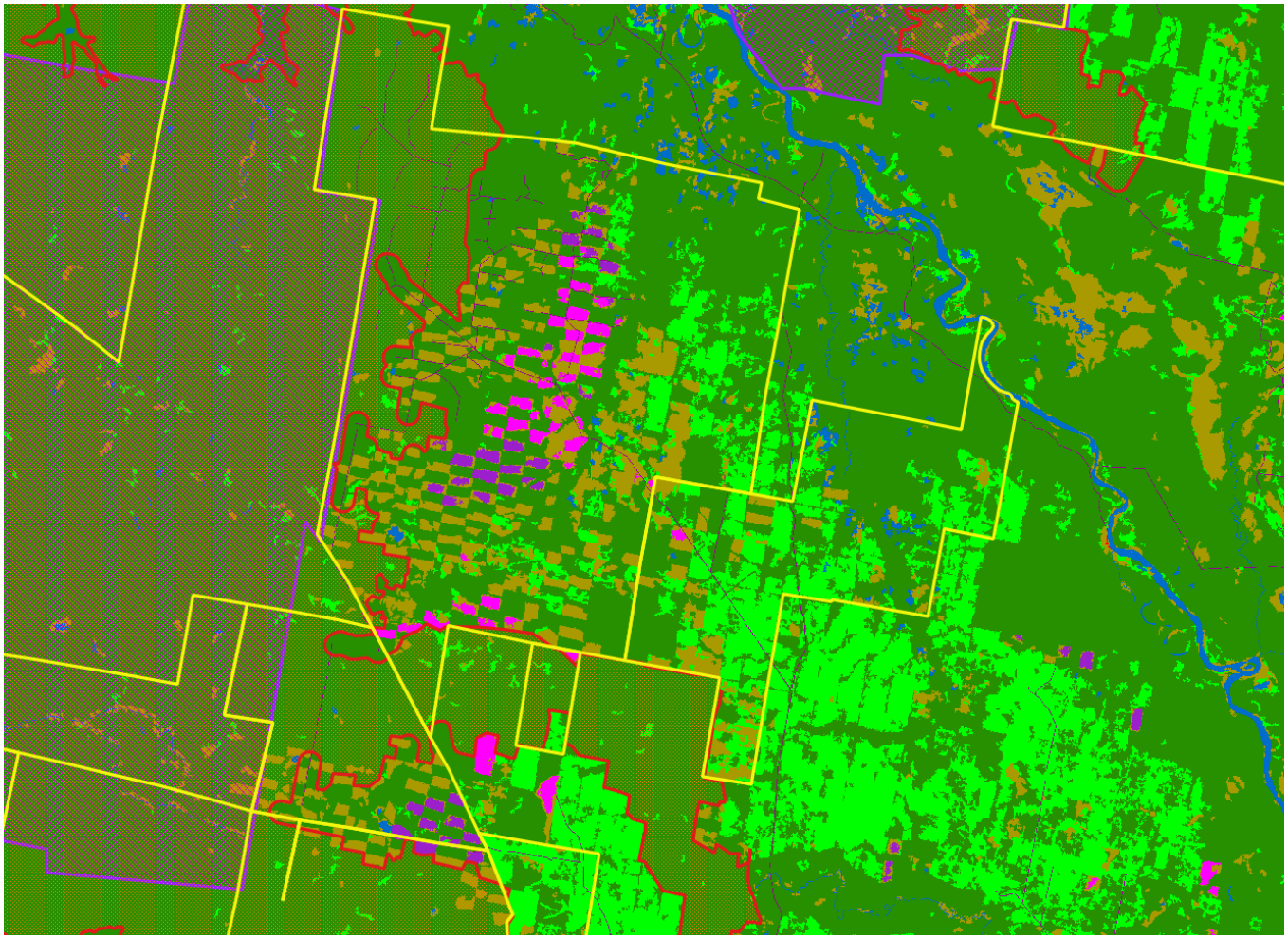


Natural forest Forest plantation
Agriculture, bare soil, grassland
Settlement Water Road

Russia – Sentinel-1 data

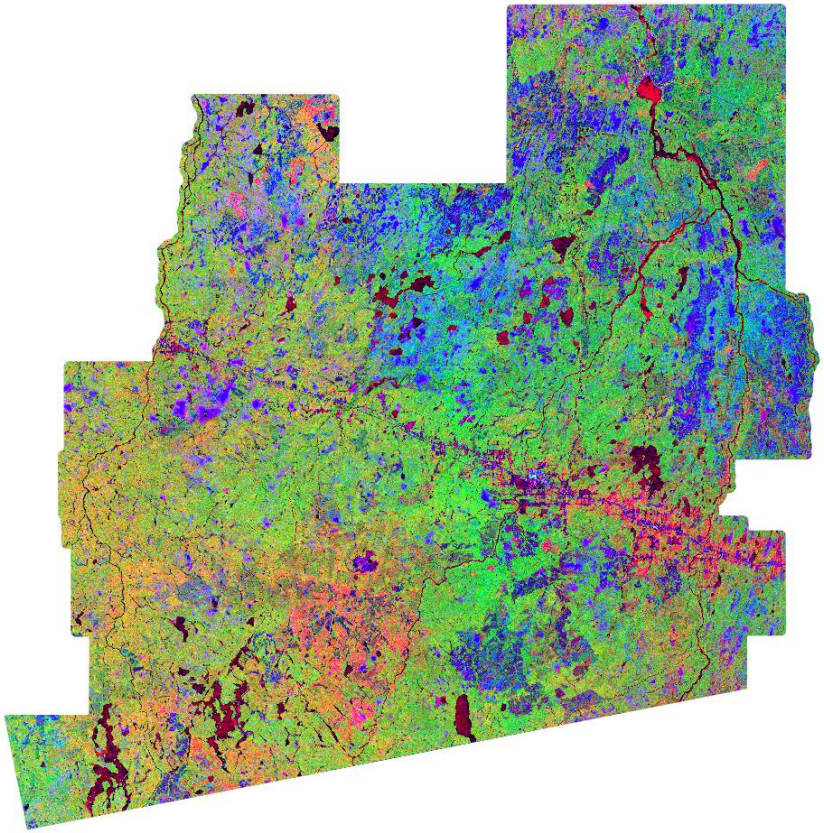


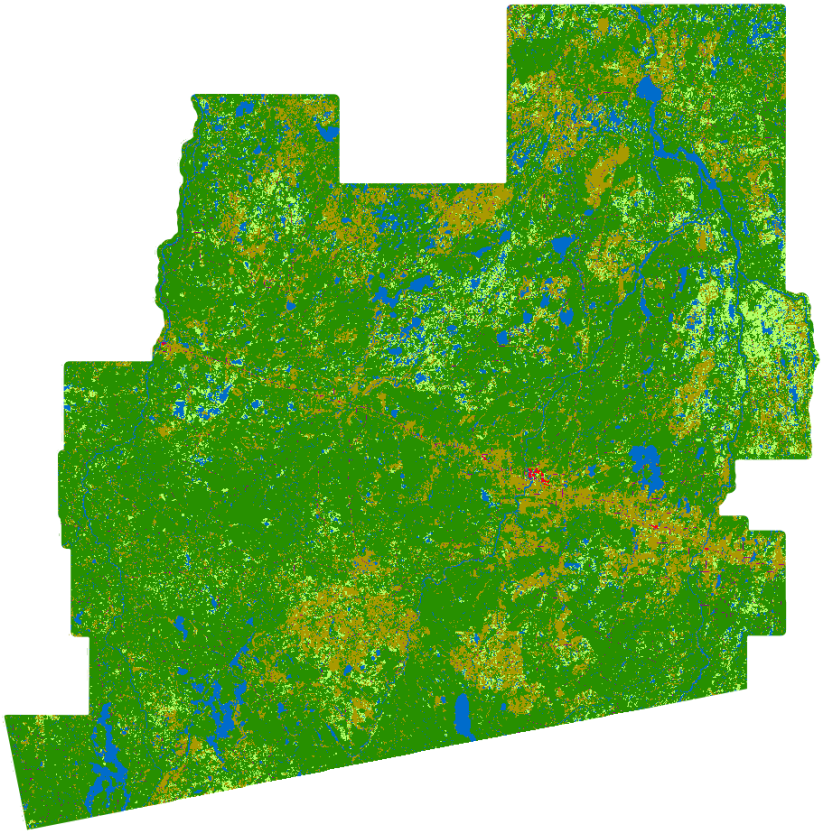
Russia – LCM based on PALSAR-1, ALOS-2, Sentinel-1 data (detail)



Natural forest
Forest plantation
Agriculture, bare soil, grassland
Settlement
Water
Road
Clearfell 2007-08
Clearfell 2008-09
Clearfell 2009-10

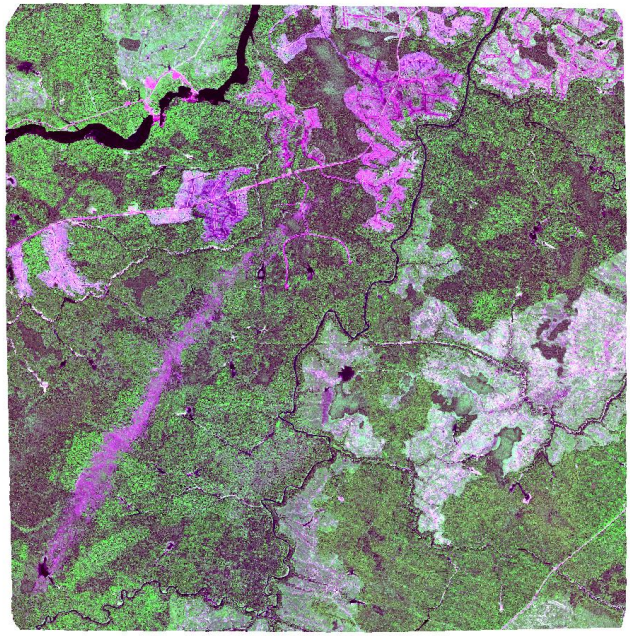
Canada – LCM based on ALOS-2, Sentinel-1, Landsat-8 data

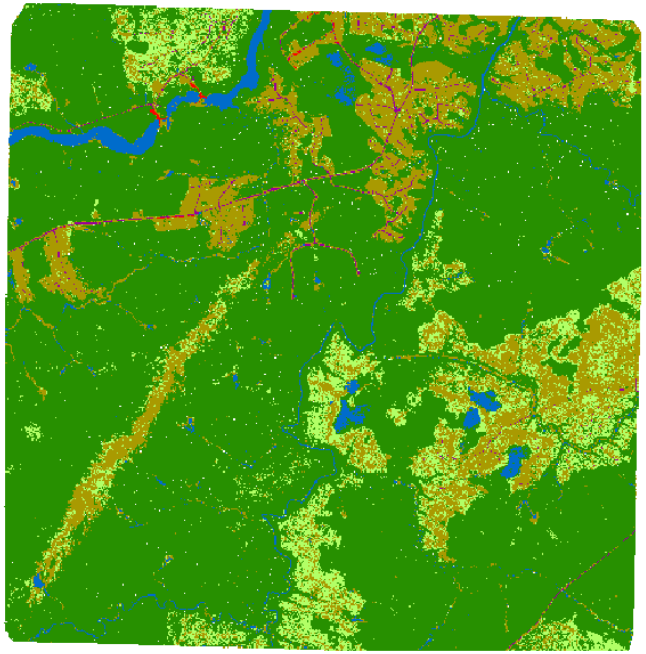




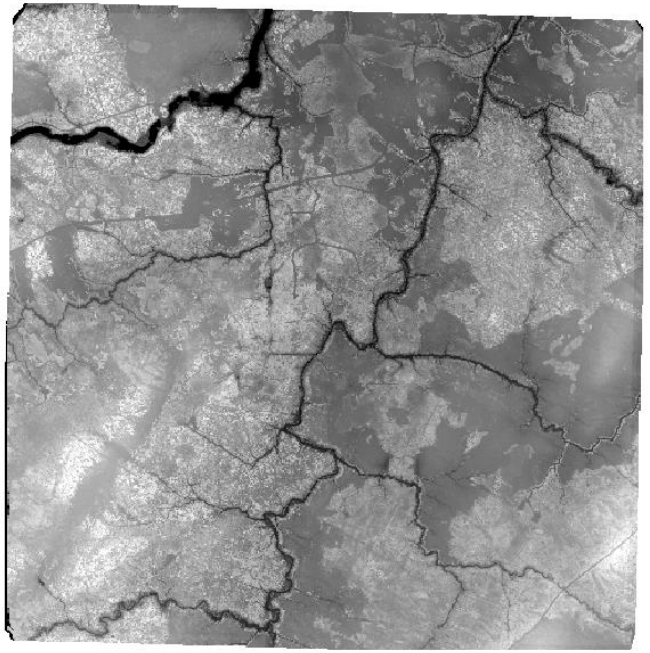
Natural forest Forest plantation
Agriculture, bare soil, grassland
Settlement Water

Canada – Detailed LCM and DSM using Pléiades stereo data (0.5m)

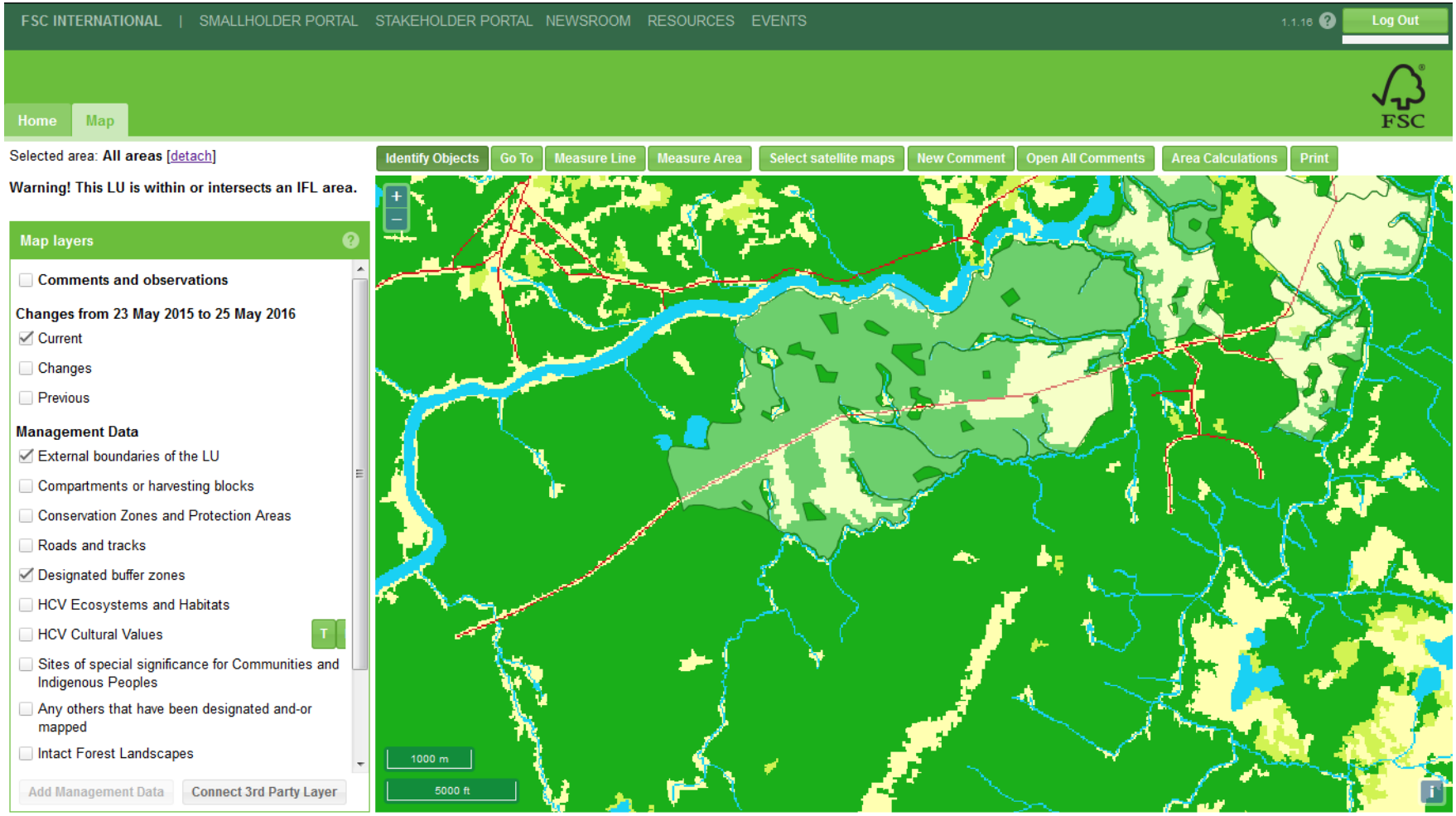




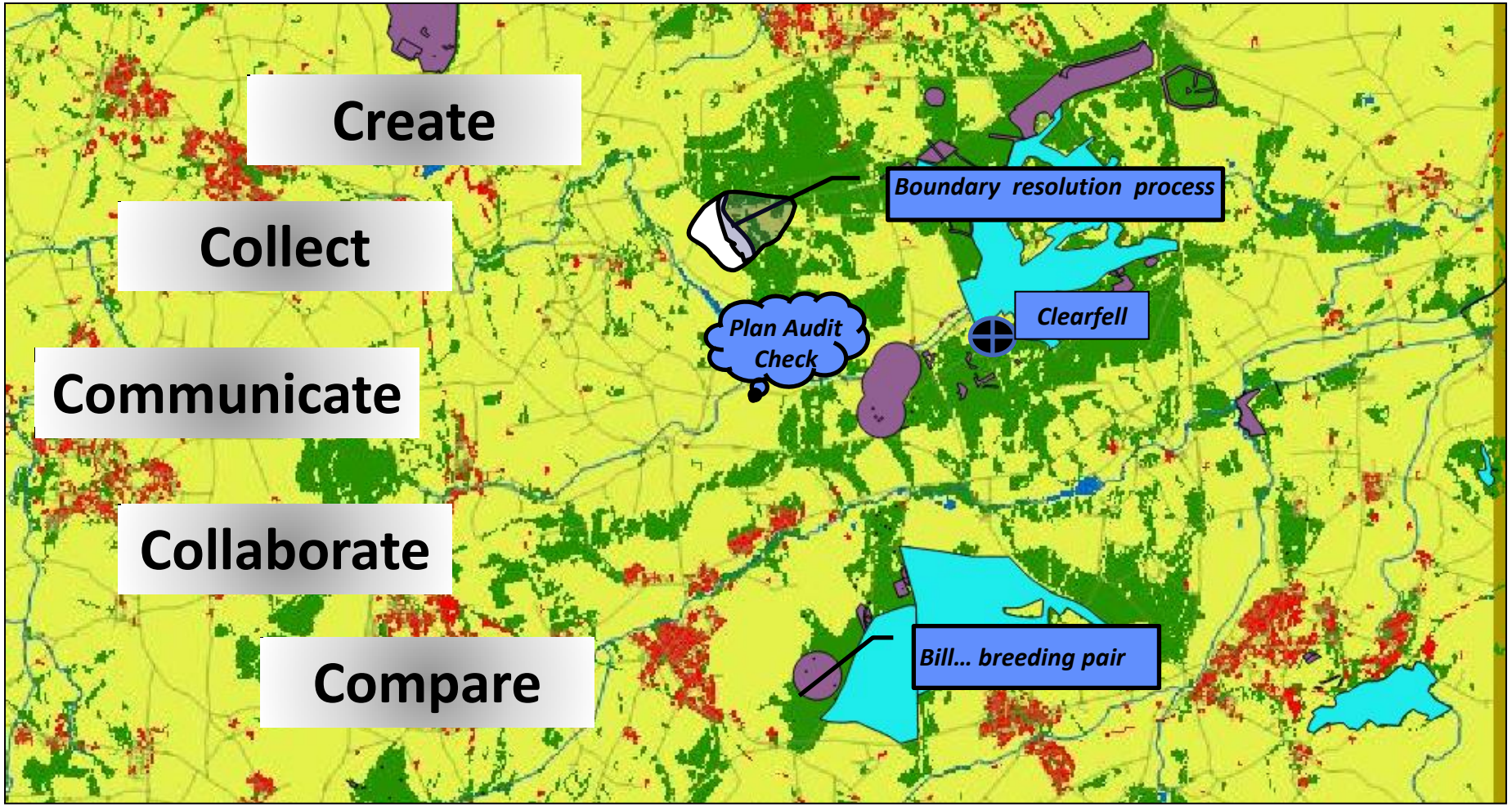
Natural Forest
Scattered Trees, bushland, shrubs
Bare soil, agriculture, grassland
Water
Infrastructure
Road



Web-GIS


FSC INTERNATIONAL | SMALLHOLDER PORTAL STAKEHOLDER PORTAL NEWSROOM RESOURCES EVENTS
1.1.16
Log Out
Home
Map
FSC
Selected area: All areas [detach]
Warning! This LU is within or intersects an IFL area.
Identify Objects
Go To
Measure Line
Measure Area
Select satellite maps
New Comment
Open All Comments
Area Calculations
Print
Map layers
Comments and observations
Changes from 23 May 2015 to 25 May 2016
Current
Changes
Previous
Management Data
External boundaries of the LU
Compartments or harvesting blocks
Conservation Zones and Protection Areas
Roads and tracks
Designated buffer zones
HCV Ecosystems and Habitats
HCV Cultural Values
Sites of special significance for Communities and Indigenous Peoples
Any others that have been designated and-or mapped
Intact Forest Landscapes
Add Management Data
Connect 3rd Party Layer
1000 m
5000 ft

Mobile-GIS


Create
Collect
Communicate
Collaborate
Compare
Boundary resolution process
Clearfell
Plan Audit Check
Bill... breeding pair

Mobile-GIS

Conclusions

- **The service has been successfully tested in eight different countries, validated and positively evaluated by timber companies, forest certification bodies, NGOs, and forest verifier (SGS).**

- **Concerning the remote sensing component, results clearly demonstrate that irrespective of the geographical area, biome, and time of year, time-series from different sensors have to be considered, particularly to enhance the data quality, to better differentiate the various land cover types, and to provide a high level of automation.**

- **ALOS-2 Fine Beam data play doubtless an important role, particularly for the retrieval of timber volume. Nevertheless, given the limited annual acquisition frequency (e.g. twice a year), the potentiality and use of ALOS-2 FB data is only partially exploited.**

Deliverables

Following information have been provided:

- **Geo-referenced field photos – jpg format;**
- **Bio-physical forest information – shape file;**
- **Geocoded and calibrated EO products – GeoTIF format;**
- **EO products – GeoTIF format.**

One-Year Extension

Estimation of savanna biomass in Sudan

- Given the limited ALOS-2 FB mode acquisition frequency, the use of ALOS-2 FB data is definitely more appropriate in such eco-systems where the land coverage is confined to few classes (e.g. mainly tree, bare soil, grassland), particularly significantly different, and land cover changes are not rapid.
- The Sahelian Acacia Savanna is doubtless well representative for this type of eco-system. For this reason, the proposed one-year extension would like to focus in this geography.

One-Year Extension

Estimation of savanna biomass in Sudan

- Sudan – Total forests area in this country is 61,627,000 ha representing around one fourth of the total land area.
- The forest cover changed during the period 1990 - 2000 from around 71mio to 61mio ha (annual change of around 1mio ha).
- Deforestation and forest degradation are in fact the major threats to the forestry development.

One-Year Extension

Estimation of savanna biomass in Sudan

1. To understand and quantify capabilities of ALOS-2 FB data in this specific eco-system for:

a. Forest area mapping purposes;

b. Annual forest area changes purposes;

c. Forest biomass estimation.

2. To combine ALOS-2 FB single-date data with seasonal Sentinel-1 time-series and quantify the impact on the above listed products.

3. To up-scale country-wide the products (refer 1 a-c).

4. Polarimetric Super Sites is highly appreciated – Twice a year is sufficient.

One-Year Extension

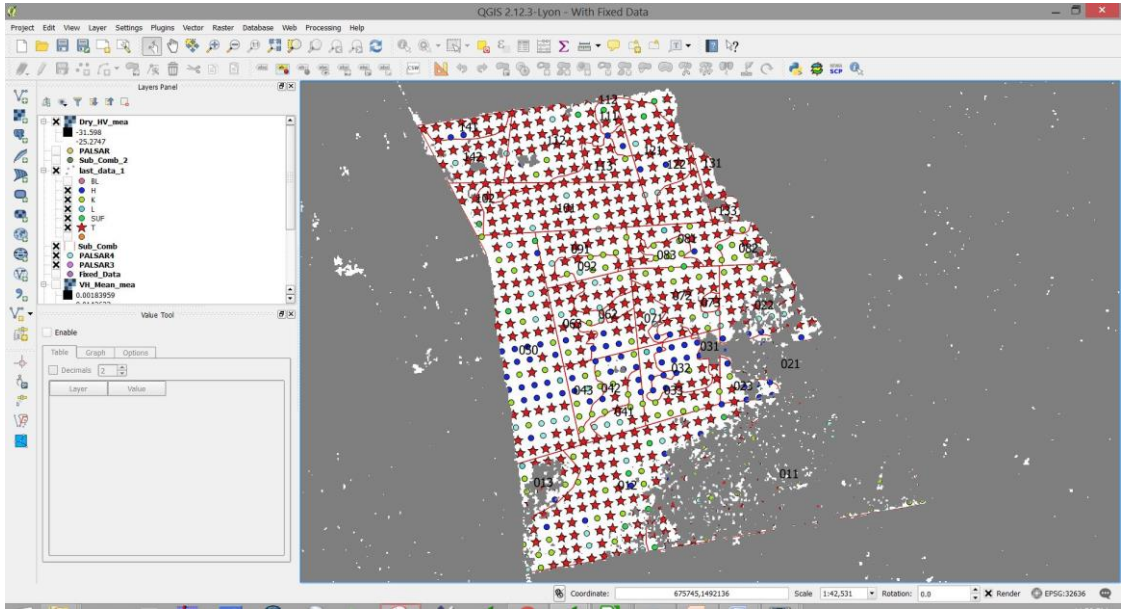
Estimation of savanna biomass in Sudan

- This work will be initially carried out in two sites in Sudan, where land cover data and bio-physical parameters (biomass, DBH, tree heights, land cover) have been collected in the past years within the on-going Ph.D. work – supervised by sarmap – at University of Khartoum in collaboration with MoF by Ms. Anwar SidAhmed Mohamed Abd Alla.

- Up-scaling according to ALOS-2 FB data availability.

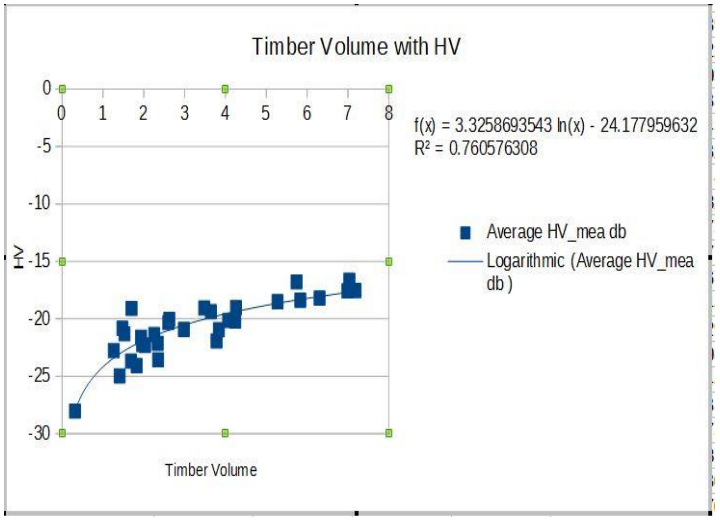
One-Year Extension

Estimation of savanna biomass in Sudan



Privided by Anwar SidAhmed Mohamed Abd Alla

Example of data collected (left) and TV-HV relationship (bottom)



Thank you for your attention