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GEOSPATIAL TOOLKIT

Open Foris Geospatial Toolkit Tutorial

Introduction

Bangkok, April 2016

Tutorial scheme

- Remote sensing and Land cover mapping
- Why the Open Foris Geospatial Toolkit ?
- Training program
  - Module 1: Handling data
  - Module 2: Basic image processing
  - Module 3: Classification processes
  - Module 4: Segmentation and OBIA
  - Module 5: Change detection
  - Module 6: Accuracy assessment and Statistics

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Remote Sensing and Land cover mapping

Biodiversity

FORESTRY

Disease (malaria)

Meteorology

POPULATION CENSUS

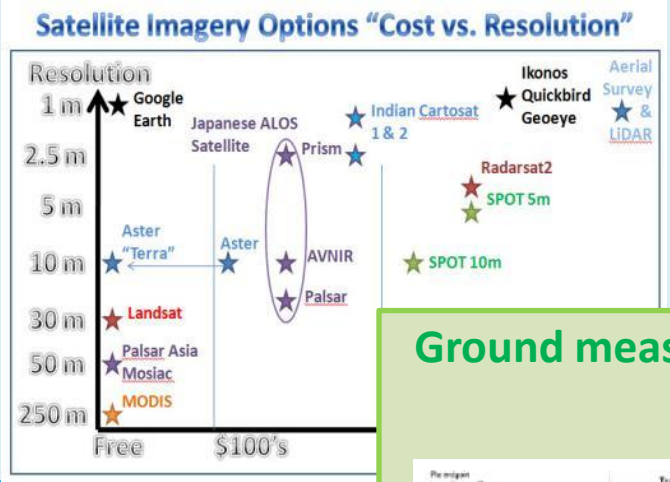
HYDROPOWER

Urban & Landuse Planning

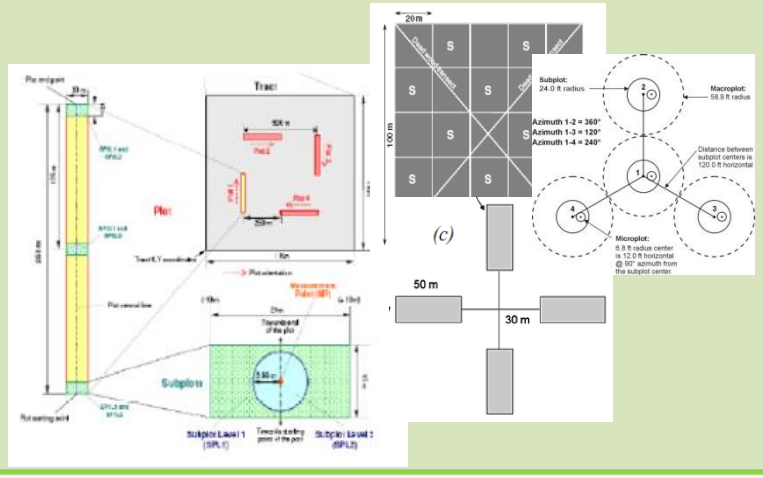
FLOOD RESPONSE

Border Mapping
National Defense

Remote sensing

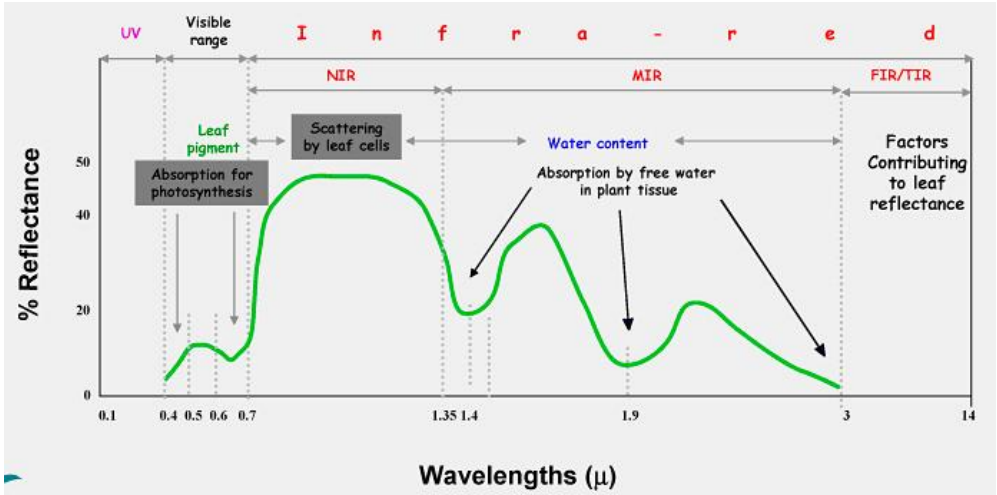


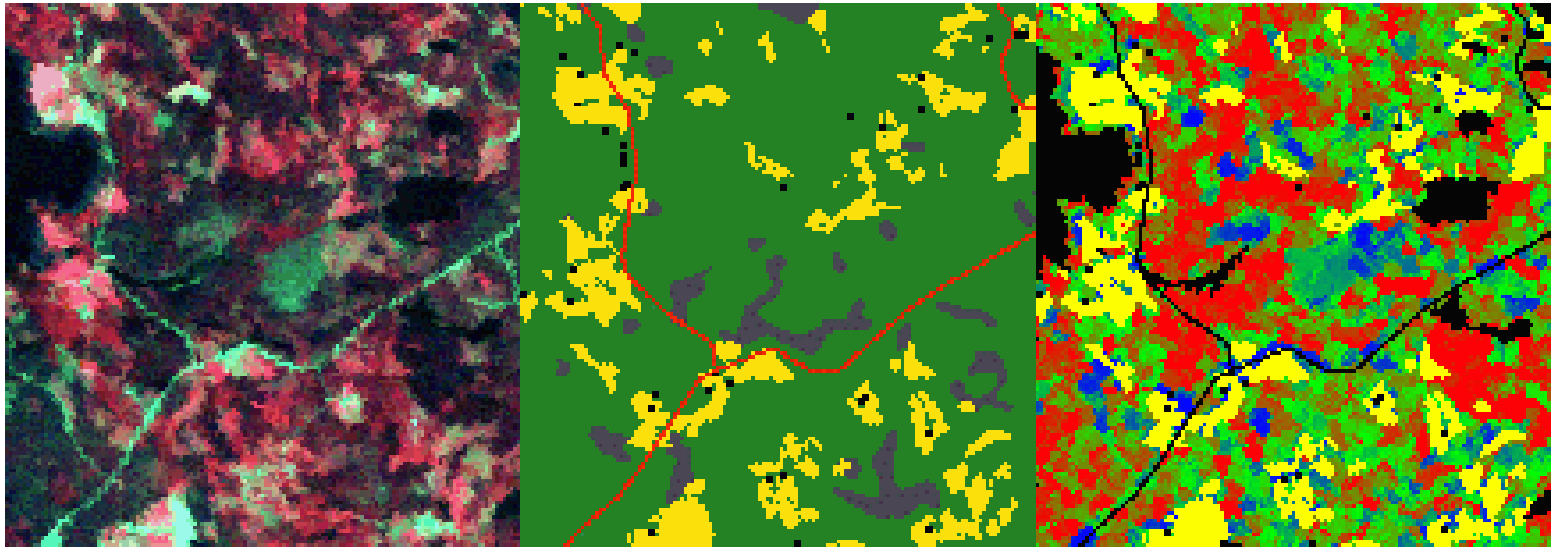
Ground measurements



How to integrate ground field measurements and remote sensing into one system?

Classification of satellite data





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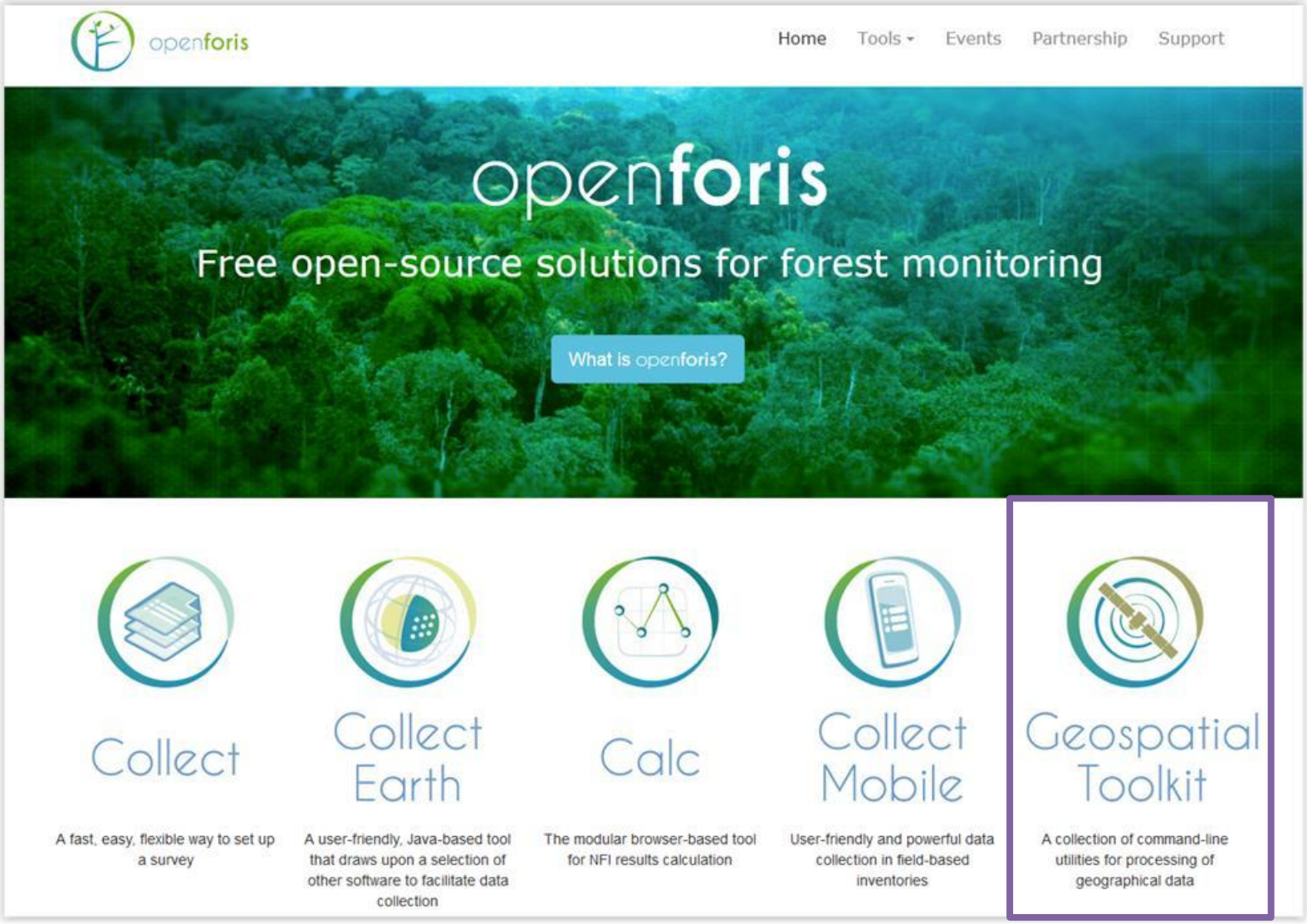
FOSS tools developed by FOM



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Why OF Geospatial Toolkit ?

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What is OFGT ?

ubuntu
linux for human beings

www.ubuntu-fr.org

GDAL

www.gdal.org

www.r-project.org

OSGeo
Your Open Source Compass

www.osgeo.org

openforis

```
oft-nn -i images/landsat_t1.tif -o results/my_knn.tif
```

Following variables will be asked:

```
Input signature file name?:text/sig_landuse.txt
Number of k?:5
Nbr of output variables?:1
Cols of 1 output vars in sig file?
Output var 1: 2  //Here we define col2 where the information on landuse-classes is stored in sig_landuse.txt
Class/Other = (0/1)?: 1
```

5. Load your result *my_knn.tif* in QGIS:

You can see the polygons labelled corresponding to their landuse-class on top of our result *my_knn.tif*, of which the pixel values vary between 1-5 (

Result *my_knn.tif* overlayed with *landuse.shp*.

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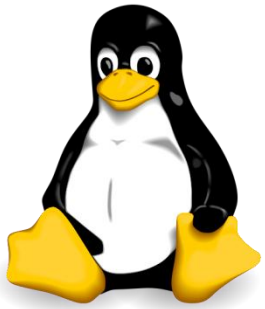
Why LINUX and FOSS ?



- Freedom: free to download / test / install / modify/ configure / develop / distribute / ... it's fun!

- Security: extremely stable and reliable, no viruses, interoperable: Unix, Windows, Mac

- Applications: thousands of free programs, programming languages, server services

- Versatility: minimum HW requirements, extremely portable, very fast performance

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Why UBUNTU ?

- GUI – Friendly: interactive and intuitive
- Popular: high number of packages
- Well supported : very active communities. Extensive documentation.

If you have a problem, someone had it before and documented it!

https://help.ubuntu.com/12.04/ubuntu-help/index.html

Why GDAL / OGR ?

- Geospatial Data Abstraction Library
- Extensive capabilities of data exchange
- More than 120 raster geospatial data formats

http://www.gdal.org/

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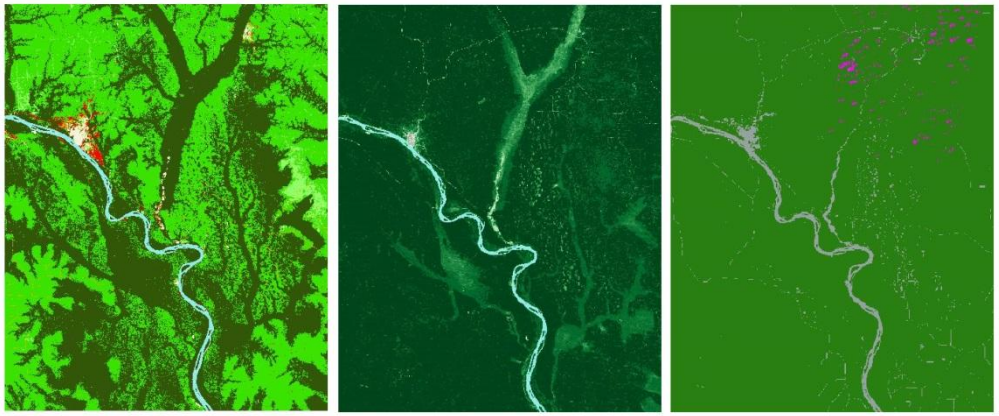
Modules presentation

Module 1: Handling Data

Theory

- Remote sensing data structures and formats
- Projection systems
- Linux architecture



Practice

- Discovering Live Linux environment
- Basic Linux command lines
- Basic GDAL command lines
- Viewing data

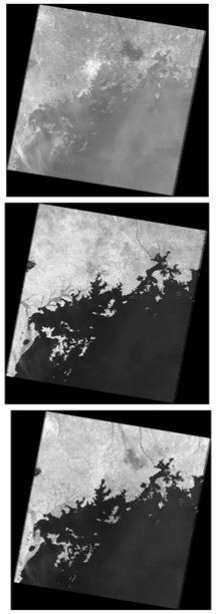
Module 2: basic image processing

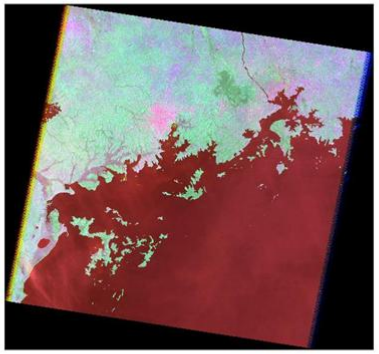
Theory

- Multispectral data and land feature detection
- Re-sampling and corrections

Practice

- Stacking
- Sub-setting
- Re-projecting





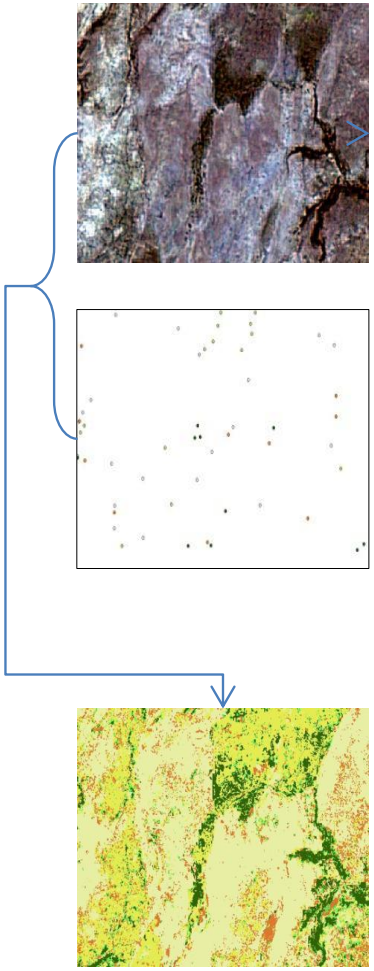
Module 3: classification processes

Theory

- Image classification principles
- Training data sensitivity

Practice

- K-means clustering
- Supervised classification
- Sieving and filtering



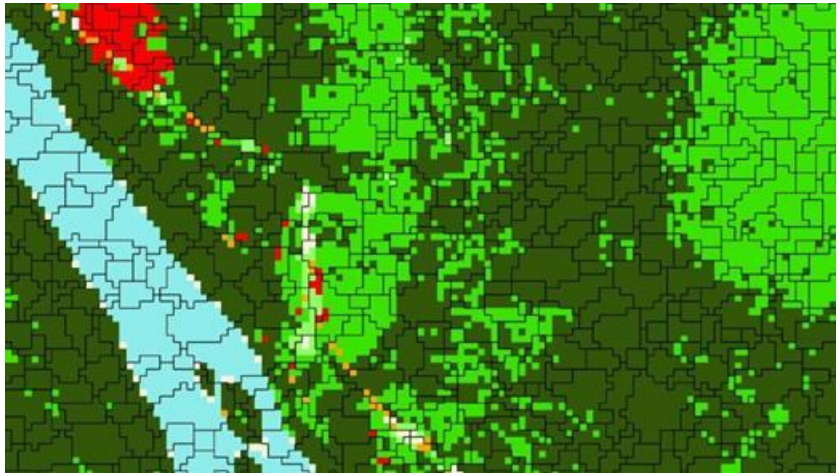
Module 4: segmentation and OBIA

Theory

- What is segmentation about ?
- From pixel to objects

Practice

- Segmentation
- Decision trees for OBIA



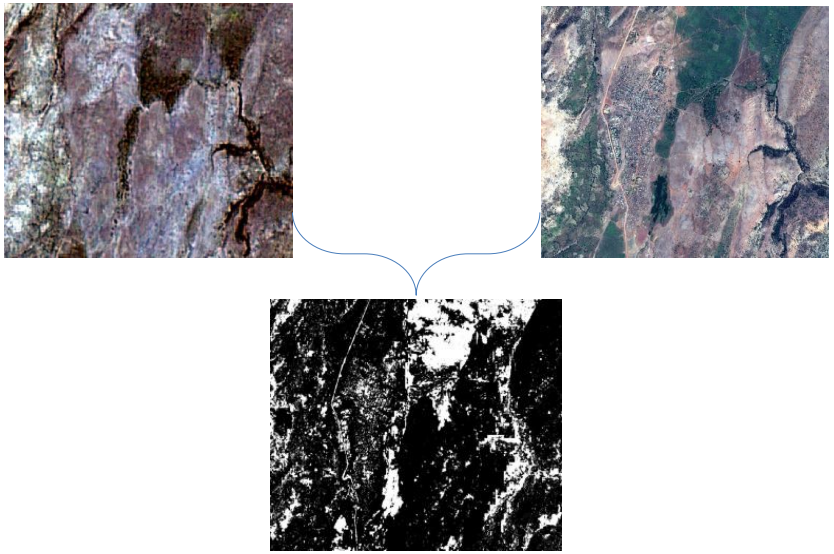
Module 5: change detection

Theory

- Time series and land cover activity data
- Problem of the stock-difference method

Practice

- IMAD algorithm
- Multi-date classification



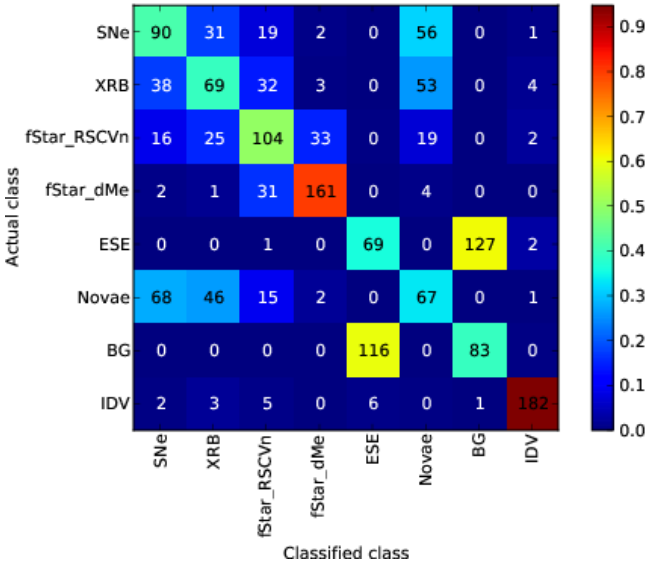
Module 6: accuracy assessment, statistics

Theory

- Why assess accuracy ?
- Zonal statistics, land cover confusion matrices

Practice

- Point interpretation (CE)
- Zonal statistics and interpretation
- R-based interface



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