Novel algorithms based on active-passive data synergies to retrieve forest variables

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The EO-ROFORMON project

The EO-ROFORMON project aims to prototype a novel national forest monitoring and forecasting system based on earth observation data

Forest type
- Available inputs
- Possible classification techniques
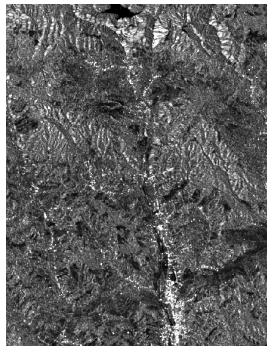- Possible workflow for classification

Fractional canopy cover
- Approaches
- Validation

Forest health

Biomass

Forest type classification: available inputs
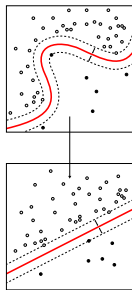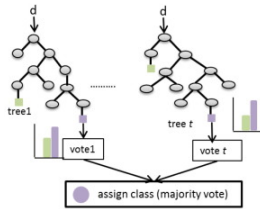

(a) Sentinel 1   (b) Sentinel 2   (c) Derivatives

Figure: Available imputs for forest type classification (images a and b downloaded from ESA, image c obtained from Gamma remote sensing)
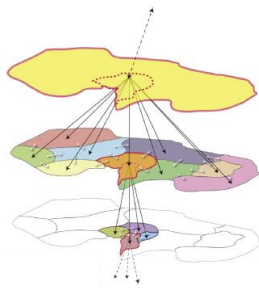
(a) SVM   (b) Random Forest   (c) OBIA

Figure: Available techniques for forest type classification (images from Wikipedia, Belgiu 2016 and Blaschke et al., 2014)

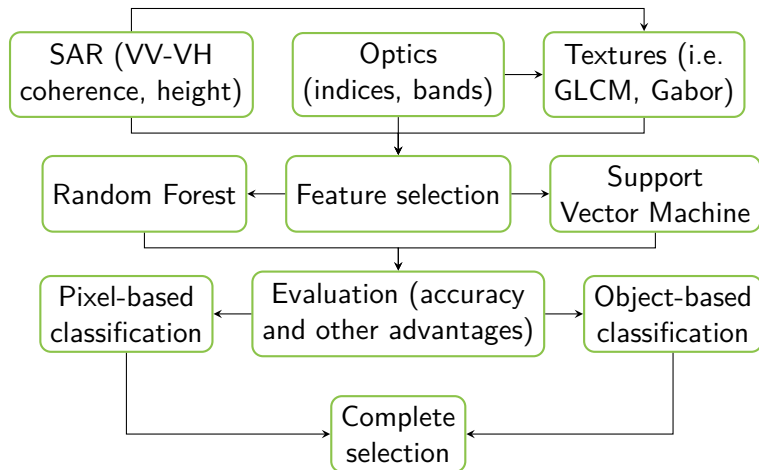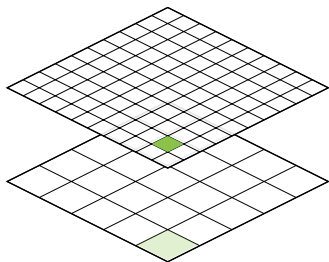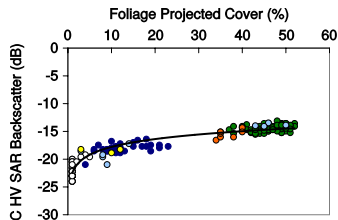# Possible workflow for classification

Figure: Possible workflow

(a) Aggregation   (b) Regression

Figure: Comparison of the two approaches envisaged for fractional canopy cover extraction (modified from Texample and from Lucas, 2006)
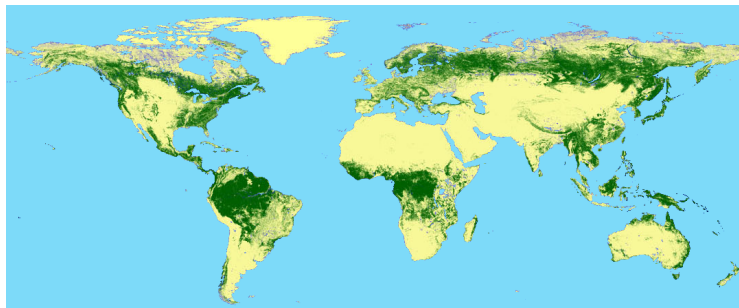
Validation of fractional canopy cover

Figure: The ALOS forest/non-forest mask will be used for validation (Image obtained from Jaxa)

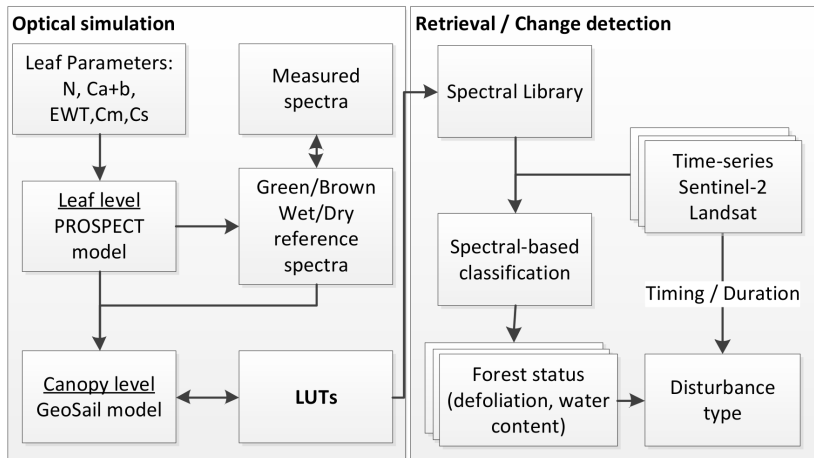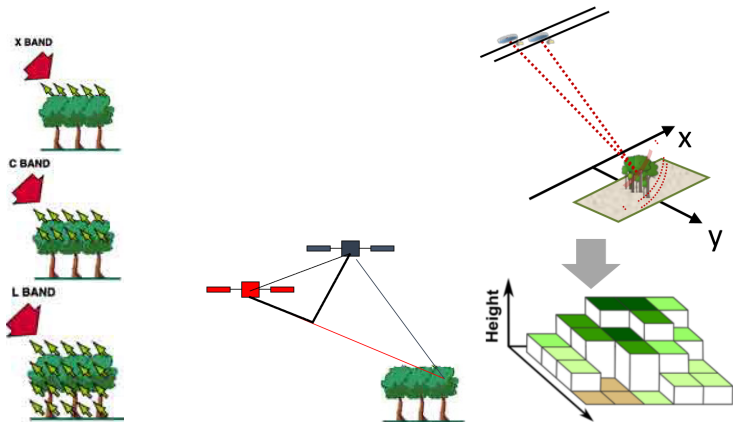# Scheme for detection of changes in forest health

Figure: Envisaged scheme for forest health changes detection (modified by Tanase from the original in de Santis, 2009)

Biomass retrieval

(a) Backscatter based   (b) InSAR based   (c) Based on PolInSAR

Figure: Available methods for biomass calculations with SAR (images from ESA, Tanase, 2015 and CNES)