# Forest Modelling from ALOS PALSAR Data

Objectives

A customized PALSAR based service aiming at the provision of plantation wide cost effective enumeration data has been developed and trialled. The service, which is based on the integration of specific PALSAR derived/inferred products, in forestry models, consists in:

- Generation of thematic (land cover and change) maps;

- Inference of biophysical parameters, i.e. tree height, diameter at breast height, basal area, timber volume.

Results

In a series of trials in Mpumalanga (South Africa), multi-temporal (interferometric) ALOS PALSAR Fine Beam Dual data were used over a range of operational conditions to confirm service robustness for application in typical plantations. The results confirm the service can successfully determine input variables (> 80% accuracy) required to estimate standing timber volume at a compartment level and provide, in an automated way, precise land cover/change maps (> 95% accuracy). Operational integration into forest management systems offers additional values when biophysical data are combined with more accurate Earth Observation measures of compartment effective area and heterogeneity, status of fire breaks monitoring and burnt areas and severity.
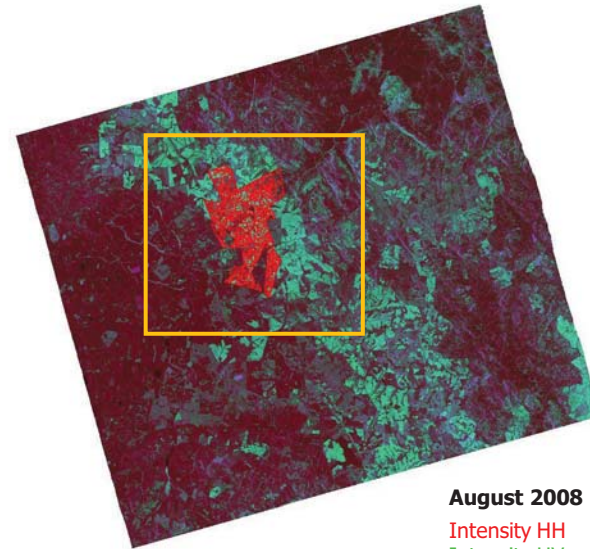

August 2008
Intensity HH
Intensity HV
Intensity Difference
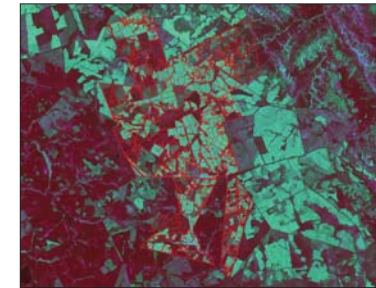
Land cover map – The algorithm, which is an automatic modular hierarchical prior knowledge-based one, has been developed based on L-band characteristics of PALSAR Fine Beam Single and Dual polarization data. In essence, in this system, rules are designed to detected and extract known land cover classes from single-date **PALSAR HH/-HV intensities** (bottom left) and, whenever available, **including HH-coherence** (bottom right).

0 40m   0 50cm   0 36m²/ha   0 500m³/ha
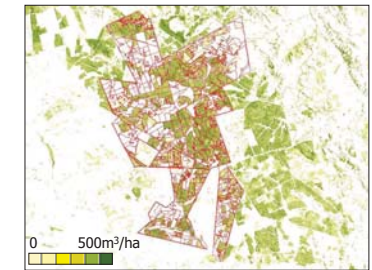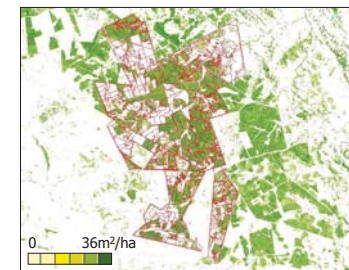
Biophysical parameters – The estimation **of tree height** (left), **diameter at breast height** (middle left), and **basal area** (middle right) – the three key biophysical parameters required as input parameters into the forest model for the estimation of **timber volume** (right) – is performed by applying regression analysis by species on samples basis and PALSAR HV data. **Trees per hectare** are additionally estimated by considering basal area and diameter at breast height. The service was tested across a range of operational conditions to confirm that the service could be used: across different topography, at sub compartment level, across age classes, across pine species, across season and weather conditions to provide services to support and improve management of saw log plantations. In overall, the service has been evaluated as valuable and useful in that it has allowed to demonstrate the utility of PALSAR for forest mapping/monitoring and retrieval of forest parameters purposes over large areas on sawn timber plantations.

sarmap
your information gateway