

## **Estimating Potential Woody Biomass in Communal Savanna Woodlands from Synthetic Aperture Radar (SAR)**

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### **Abstract**

Recent developments in Synthetic Aperture Radar (SAR) technologies have shown their potential for assessing and quantifying above-ground biomass (AGB) at landscape levels in different biomes. This paper examines the application of full polarimetric data to retrieve information related to potential woody biomass in sparse communal savanna woodlands in southern Africa using the Advanced Land Observation Satellite's Phased Array L-band Synthetic Aperture Radar (ALOS PALSAR). Woody vegetation classes were obtained from the unsupervised entropy/alpha Wishart classification of the full polarimetric ALOS/PALSAR data. A combination of Differential GPS and conventional surveying techniques was used for a field inventory survey to estimate plot-level biomass densities in Welverdiend communal woodlands of South Africa. Regression analysis was used to derive the logarithmic relationship between the sampled plot AGB densities and the mean backscatter intensity of the microwave signal, which is transmitted in the horizontal plane and received in the vertical plane (HV). The AGB density for each woody vegetation class is estimated by solving the logarithmic equation after extracting the mean HV backscatter intensity for the particular vegetation class. The potential woody biomass is estimated from the derived AGB densities and the areal extent of the respective woody vegetation classes.