

2024 IEEE International Geoscience and Remote Sensing Symposium and Remote Sensing,  
Athens, Greece, 7 - 12 July 2024

Multi-temporal assessment of woody canopy cover changes in South Africa; products and analysis based on GEDI, sentinel-1 and 2 data

Qabaqaba, M; Naidoo, L; Tsele, P; Ramoelo, A; Cho, Moses A

**Abstract**

Monitoring of forest extent and structure at national scale is essential task in the context of climate change for conserving biodiversity, developing national forestry inventories and projecting the future of terrestrial carbon sinks. Multitemporal monitoring of woody canopy cover is needed to achieve the aforementioned task. The current study sought to demonstrate the potential of remote sensing sensors in generating multi-temporal woody canopy cover products for South Africa. The combination of freely available high spatial and temporal resolution from sentinel-2 (multispectral) and sentinel-1 (Synthetic Aperture Radar) and with canopy cover samples from the Global Ecosystems Dynamics Investigation (GEDI) enables multi-temporal assessment of woody canopy cover. The use of Random Forest (RF) machine learning algorithm to model woody structure over a period of five years (2019 – 2023) revealed changes in some woody biomes of South Africa, due to fragmentation, bush encroachment and degradation. These products provide national information on woody canopy cover on a consistent basis. Furthermore, the products provide a better understanding on the changes, distribution and extent of woody ecosystems in South Africa.