

# Foreword to the Special Issue on Forest Structure Estimation in Remote Sensing

**F**ORESTS are important ecosystems to all life on Earth. They provide shelter for many flora and fauna, rich resources for anthropogenic development and an important sink in the global carbon cycle. Satellite earth observation provides a critical capacity to observe this ecosystem wall to wall. Especially, synthetic aperture radar (SAR) and Lidar technologies hold large potential to measure forest structure properties such as forest height and biomass and are consequently used in existing observation systems. In addition to the existing observation systems space agencies are implementing or planning dedicated satellite missions capitalizing on these technologies, such as ESAs BIOMASS, NASAs GEDI, and NISAR missions or DLRs Tandem-L mission concept. Despite the sensitivity of SAR and Lidar technologies to forest structure the actual interpretation of the measurements is challenging. Forest structure, environmental effects and system parameters have a confounding effect on the measurements and need to be accounted for in the biophysical parameter retrieval. The impact of these factors is often not well understood and hampers our ability to make optimum use of newly available technologies and their synergies. The most striking development in the last years was in the three-dimensional (3-D) radar data processing. The evolution and refinement of coherent multibaseline (tomographic) processing techniques dramatically increased the quality of the reconstructed 3-D radar reflectivity allowing a deeper insight in the 3-D scattering processes at different polarizations and frequencies and of the opportunities arising from this new measurement technique to monitor and investigate 3-D forest structure. This special issue collect and highlight the latest results,

data processing developments and lessons learned from existing satellite data, airborne data and tower based research campaigns.

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