

# Classification of Polarimetric SAR Imagery for Forest Extraction with Airborne LiDAR Data

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Forest resource assessment is important because it plays a significant role for absorbing carbon dioxide and storing them in their trunks. In recent years, the progress of analysis method with optical imagery and Synthetic Aperture Radar (SAR) imagery using object-oriented classification for vegetation maps is accelerating. SAR transmits a micro wave from an antenna and receives its backscattering. SAR has all-weather capability and it enables us to obtain data frequently. Obtained data provides physical characteristics of the Earth's surface. To analyze or decompose multiple polarized micro wave helps us to observe the condition of land surface. Volume scattering component is dominated in forestry. Furthermore, light detection and ranging called LiDAR is used to detect height of tree crowns or buildings and reconstruct 3D models. We can get height information from LiDAR data with two-dimensionally. In this study, we developed a method to extract forest area by integration of polarimetric ALOS-2 PALSAR-2 imagery and LiDAR data. We also assessed the usefulness of our method. ALOS-2 PALSAR-2 is a unique L-band SAR sensor and it has potential of full polarimetric observation. The result of this study shows a possibility to update local-land-use map.