

Stem Volume Estimation and Mapping using ALOS PALSAR L-Band Backscattering for the Coniferous Forests at Japan

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Abstract: Many researches has been implemented with the use of the Synthetic Aperture Radar (SAR) in the field of land remote sensing to solve cases that was difficult when only optical data were used. Such as Forestry, which is one of them, where it is understood that SAR can be a powerful data to use for understanding the status of the forests (biomass, biophysical parameters). However, not many researches are done at the forests of Japan, mainly due to the distortions caused by hilly rugged regions. Our objective is to understand the relationship between the SAR information and the forests to develop an empirical model that coincides with the forests of Japan and to map the status of those forests.

Statistical relationship was made between the field observation data and the L-band backscattering intensity information derived from the ALOS PALSAR satellite data. We have used the year 2010, 25 m ground range pixel spacing PALSAR Global Mosaic product, which can be ordered from Remote Sensing Technology Center of Japan (RESTEC). The data is processed with orthorectification and slope correction. An empirical approach were taken to see the relation between the stand characteristics (stem volume) and backscattering intensity and we have developed an model so that we could map the stem volume information for the forests of Chiba Prefecture, Japan as our study area. The correlation between the backscattering and stem volume showed $R^2 = 0.23$, and the result of the model showed a RMSE of 105.58 m³/ha. The results changes by the difference in polarization and species.

Keyword : L-band, SAR, Backscattering, Stem Volume