DEVELOPING A MODEL FOR WOOD VOLUME ESTIMATION OF NATURAL EVERGREEN BROADLEAF FOREST IN DAK NONG PROVINCE USING REMOTE SENSING DATA

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Summary

Forest wood volume map is an important tool for managing forest resources and implementing forestry policies. Optical remote sensing data can provide information about the surface structure of the forest canopy, chlorophyll density, etc. While radar image band L is capable of penetrating the forest canopy and is mainly reflected by the tree body and branches should be able to provide information on wood volume under forest canopy. One of the main disadvantages of radar image is speckle noise. To reduce the effect of speckle noise in radar images, this study used a statistical unit of forest inventory plot on the window size of 13x13 pixels as the homogeneous areas. Combining Landsat-8 image (optical data) and ALOS-2/PALSAR-2 (radar image band L) on homogeneous units of forest inventory plots is expected to get the best accuracy in wood volume estimation of natural evergreen broadleaf forest. 214 sample plots were used in this study, in which 143 sample plots were selected randomly for developing optimal model and 71 sample plots were used for validation. The errors in wood volume estimation using the optimal model are as following: RMSE = 28.7 m$^3$/ha, absolute error (MAE) = 21.3 m$^3$/ha, relative error (MAE%) = 24.2%, relative RMSE% = 40.6%. The result of this study could be applied to estimate wood volume of natural evergreen broadleaf forest for other regions with the similar conditions to Dak Nong province.

Keywords: ALOS-2/PALSAR-2, LANDSAT-8, NFIS, Dak Nong province, natural evergreen broadleaf forest, wood volume.