

Forest Structure Information Extraction from PolinSAR/PolSAR Data

Erxue, Chen¹; Zengyuan, Li¹; Wen, Hong²; Eric, Pottier³; Shane, Cloude⁴

¹Institute of Forest Resources Information Technique, CAF., CHINA; ²Institute of Electronics, CAS, CHINA; ³I.E.T.R - Univ Rennes 1, FRANCE; ⁴AEL Consultants, UNITED KINGDOM

The progress of our research activities on the topic of applying PolSAR or PolInSAR to forest structure parameters estimation will be presented. The research activities on three test sites will be summarized. Firstly, the potential of applying Polarization Coherence Tomography (PCT) to forest above ground biomass (AGB) estimation will be introduced using the PolInSAR data acquired in Germany Traunstein test site with E-SAR airborne system. Forest AGB estimation model is established and evaluated, and the factors possibly affecting the performance of the AGB estimation model are analyzed. The results show that the characteristic parameters, which are extracted from the average relative reflectivity function inversed with PCT are sensitive to forest AGB. The accuracy of AGB estimation can be improved if we take full use of the information contained in the relative reflectivity function. Secondly, the temporal decorrelation problems of the PolInSAR dataset acquired in the Taian test site and the limitation of applying the dataset to forest structure parameters extraction will be presented. Finally, we will introduce the forest scar mapping results using PolSAR data by both ALOS PALSAR and Radarsat-2 SAR sensor in the Tahe test site in the Northeast of China, where the ground true data have been collected through field work in the end of Sept., 2010. The data imaged in dry season (late September to early October) is better for forest fire scar mapping than that imaged in wet season (June to August). There are no significant differences for L- and C-band SAR to map forest fire scar. The radar vegetation index, Shannon polarimetric entropy and H/A/Alpha decomposition entropy show better forest scar mapping capability than the three eigen value parameters for both L- band C-band polarimetric SAR data. Although the dual-polarization data can also be used to detect the boundary between fire burned and unburned area, its potential capability to map the forest stands located inside the burned area is limited.