Title: Comparison between Pol-InSAR and SAR Tomography for Tropical Forest Height Retrieval at P-band

题目：基于P波段极化干涉SAR及层析SAR技术在热带雨林地区森林高度反演的对比研究

Abstract: Mapping forest height makes a great contribution to quantitative estimation of forest above ground biomass, leading to a better knowledge of carbon stocks stored in forests. In recent years, polarimetric SAR interferometry (Pol-InSAR) and SAR tomography (TomoSAR) techniques have become major tools for forest height retrieval based on SAR measurements. In polarimetric SAR interferometry, forest height is retrieved from single baseline polarimetric data, under the assumption of the random volume over ground (RVoG) model. For SAR tomography, instead, fully 3-D back-scattering profiles are reconstructed by jointly focusing data from multiple flights and forest height is then obtained by analyzing the shape of the vertical profiles. In this work, we aim at comparing these two techniques in the context of P-Band SAR retrieval of forest parameters in tropical areas. To accomplish this goal, both techniques are applied to the same SAR dataset at P-band, which is the one acquired by ONERA in French Guiana during the TropiSAR campaign. PolInSAR and TomoSAR forest height maps are then analyzed using Lidar measurements.

摘要：森林高度测绘对森林地上生物量的定量估算具有重大贡献，能够更好地了解森林碳储量信息。近些年来，在利用SAR数据反演森林树高方面，极化干涉SAR（Pol-InSAR）以及层析SAR（TomoSAR）技术已经成为主要手段。极化干涉SAR通过应用单基线数据，以随机体散射体/地表二层（RVoG）模型为理论基础来进行树高反演。相对而言，层析SAR通过利用多次飞行获取的观测数据来重构森林场景的后向垂直散射功率，进而根据垂直结构剖面信息进行树高的定量反演。本文的主要目的是以P波段SAR数据为基础，比较上述两种方法在热带地区森林树高反演方面的不同。为实现这一目标，本文以ONERA在法属圭亚那地区开展的TropiSAR项目为数据源，应用上述两种方法开展森林高度反演实验，最后根据Lidar测量数据进行对比分析。