

# Assessment of High-resolution Airborne Multi-band Polarimetric SAR to Estimate Forest Stem Volume in Boreal Forest of China

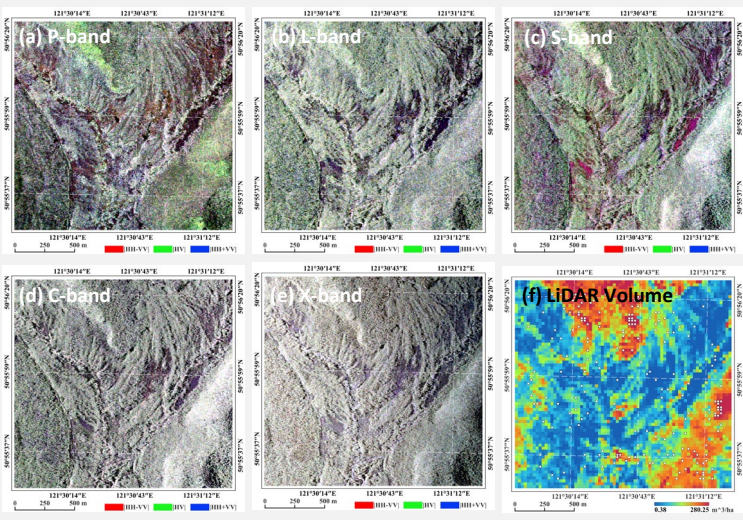


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## Motivation

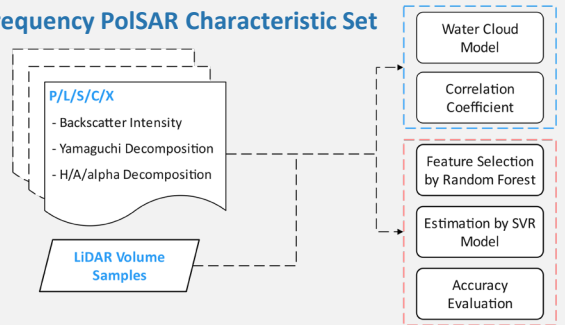
Having all five bands (P/L/S/C/X) of quad-pol SAR data, we want to understand:

- the response law and sensitivity of PolSAR data in different bands to forest stem volume
- the performance on stem volume estimation when combining multi-frequency PolSAR data



## Method

### Multi-frequency PolSAR Characteristic Set

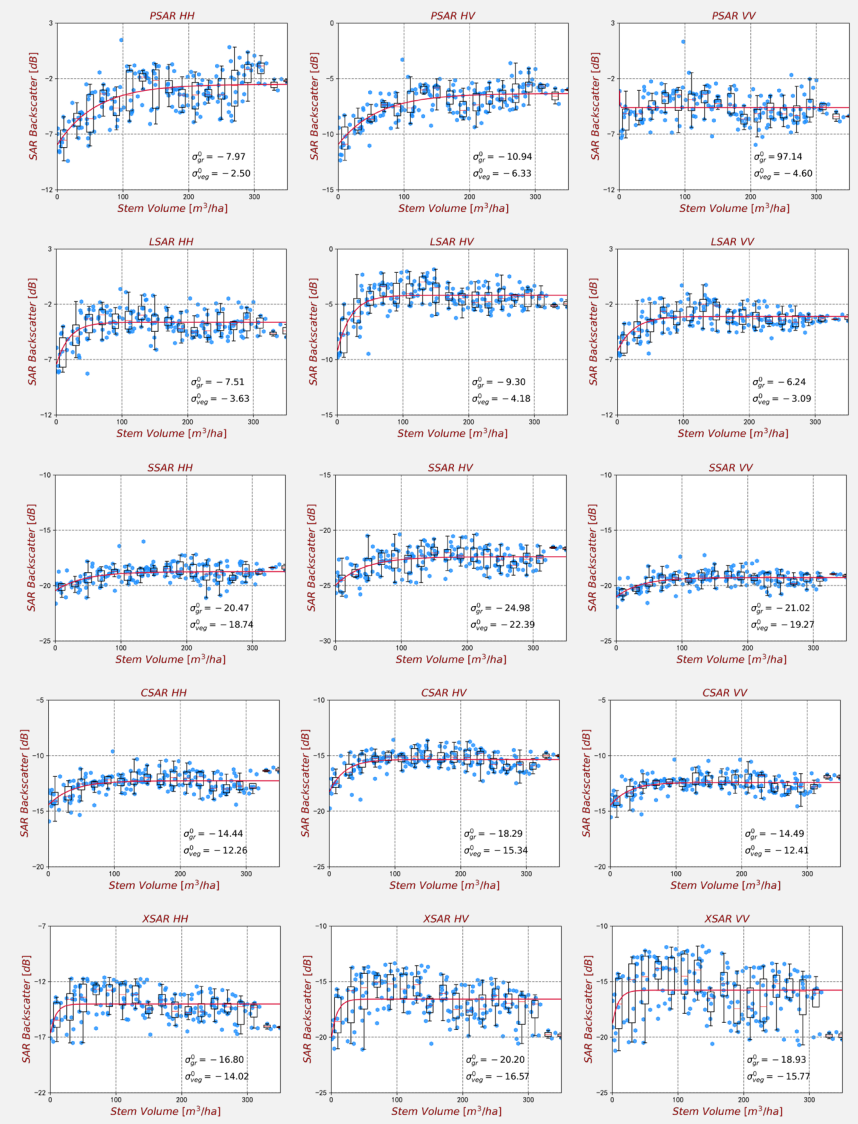


### (1) Sensitivity Analysis

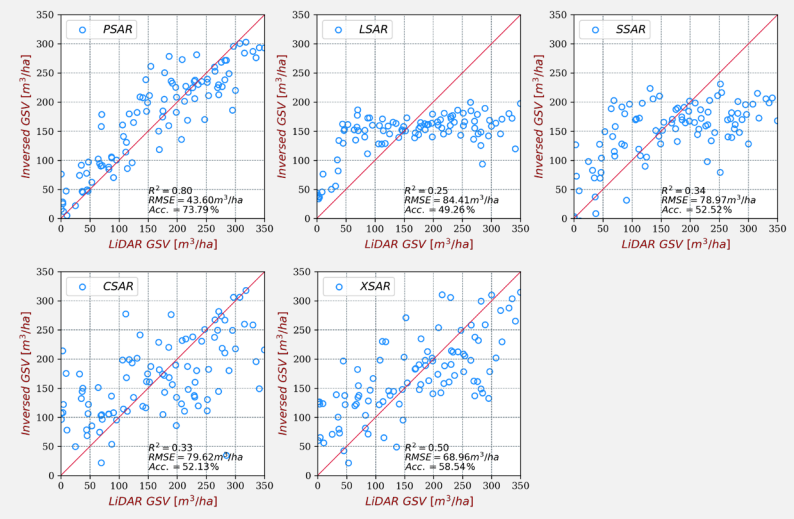
### (2) Estimation by Machine Learning Algorithms

## Sensitivity Analysis : Water Cloud Model

### Estimates of WCM parameters for different bands

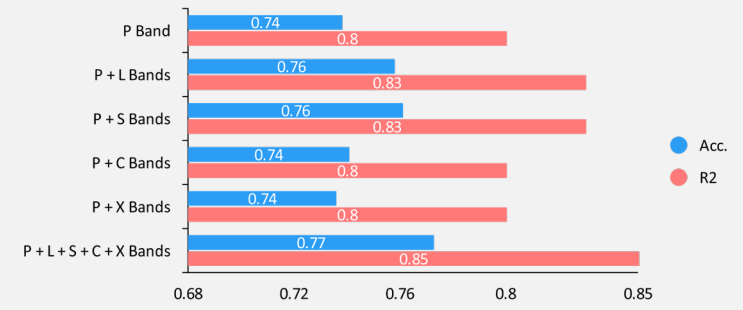


## Stem Volume Estimation for Single-frequency



(1) P band is the first choice for estimation of forest stem volume using PolSAR data.

## Complementarity of L, S, C and X with P-band



(2) when using multi-frequency joint estimation, the combination of P and L or S bands should be preferred.

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