Supplementary Materials: Sensitivity of L-Band SAR Backscatter to Aboveground Biomass of Global Forests. *Remote Sens.* 2016, *8*, 522

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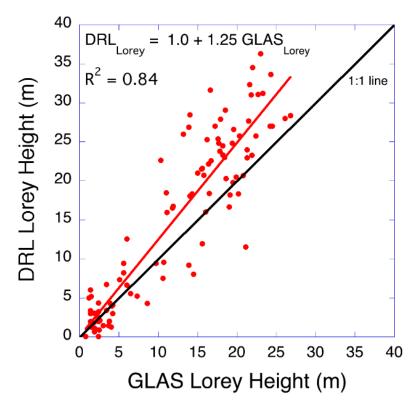


Figure S1. Comparison of Lorey's height derived from small-footprint DRL and derived from co-located GLAS shots over tropical forests. Data are from a study site (Mouila, Gabon) in southern Gabon where airborne small footprint LiDAR was collected in 2011 and compared with all existing GLAS shots in the study area. The region is a combination of forest and savanna over flat terrain. The scatter plot shows an under-estimation by GLAS of Lorey's height in this forest type, mainly due to the large footprint size of GLAS.

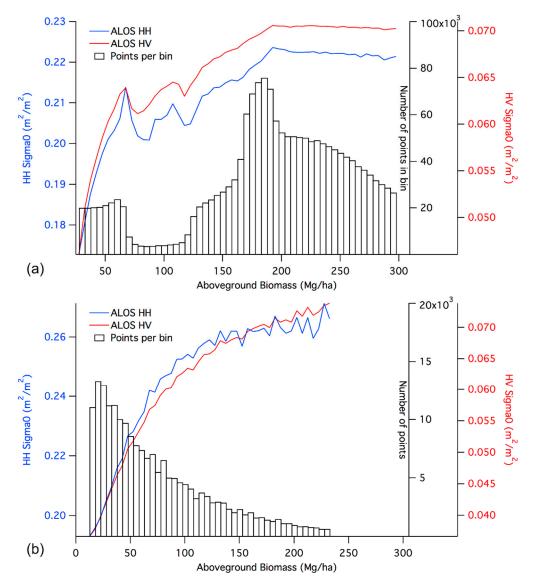


Figure S2. Comparing ALOS HH and HV polarization sensitivity to AGB for (**a**) tropical moist forests of South America; and (**b**) boreal forest of North America. Mean sigma-0 values from AGB bins are calculated and plotted against the middle AGB value of the bin. Blue lines are for HH polarization and red lines are for HV polarization. Black bars show the total number of points in each AGB bin.

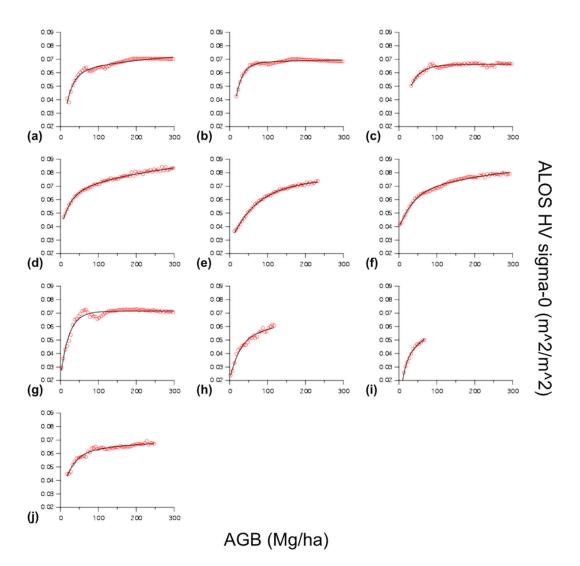


Figure S3. Empirical fit between AGB and ALOS HV sigma-0 backscatter values for all forest categories. The categories are: (a) Latin America Tropical Moist; (b) Africa Tropical Moist; (c) Asia Tropical Moist; (d) Temperate Conifer; (e) North America Boreal; (f) Eurasia Boreal; (g) Fresh Water Flooded; (h) Saline Water Flooded; (i) Tropical Shrubland; (j) Tropical Dry Broadleaf.

GlobCover Class	Name				
40	Closed to open broadleaf evergreen				
50	Closed broadleaf deciduous				
60	Open broadleaf deciduous				
70	Closed needleleaf				
90	Open needleleaf				
110	Forest/shrubland (50%–70%) + grassland				
120	Grassland (50%–70%) + forest/shrubland				
130	Shrubland (<5 m)				

Table S1. GlobCover Classes used and their corresponding landcover type name.

$\begin{array}{c c c c c c c c c c c c c c c c c c c $	-						
$\begin{array}{c c c c c c c c c c c c c c c c c c c $				Africa	Eurasia		Australia
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Tropical/Subtropical	$\alpha = 0.6011$	$\alpha = 0.6011$	<i>α</i> =0.2788		$\alpha = 0.2788$	$\alpha = 0.06328$
$\begin{array}{c c c c c c c c c c c c c c c c c c c $			$\beta = 1.894$	$\beta = 2.12$	-	$\beta = 2.12$	$\beta = 2.4814$
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Tropical/Subtropical	$\alpha = 0.73696$	$\alpha = 0.73696$	$\alpha = 0.73696$		$\alpha = 0.73696$	$\alpha = 0.73696$
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	dry broadleaf	β = 2.0062 *	β =2.0062	β = 2.0062	-	β = 2.0062	β = 2.0062
$\begin{array}{c} \alpha = 1.1799 & \alpha = 1.1799 \\ Temperate & \beta = 1.536 & \beta = 1.536 & \beta = 1.536 & \alpha = 0.061015 & \alpha = 1.1799 \\ \text{broadleaf/mixed } \alpha = 0.689 \text{ mix} & (east) & \beta = 2.6032 & \beta = 1.536 \\ \beta = 1.6932 & \alpha = 0.061015 \\ \hline & & \alpha = 0.68255 \\ \beta = 1.6939 & (\text{mixed east}) \\ \alpha = 0.18321 & \beta = 2.1059 \\ \beta = 2.1059 & \beta = 1.6939 & \beta = 1.6939 \\ (west) & \alpha = 0.71774 & \alpha = 0.68255 & \alpha = 0.68255 \\ \beta = 1.6939 & \beta = 1.6939 & \beta = 1.6939 \\ (west) & \alpha = 0.71774 \\ \beta = 1.6892 & \beta = 1.6939 & \beta = 1.6939 \\ \hline & \alpha = 0.71774 \\ \beta = 1.6892 & \beta = 1.6127 * \\ \hline Tropical/Subtropical & \alpha = 1.1633 & \alpha = 1.1633 & \alpha = 1.1633 & \alpha = 1.1633 \\ savanna, shrubland & \beta = 1.504 & \beta = 1.504 & \beta = 1.504 & \beta = 1.504 \\ \hline & \text{Temperate savanna, } \alpha = 1.3403 & \alpha = 1.3403 & \alpha = 1.3403 \\ \hline & \text{shrubland } & \beta = 1.4694 & \beta = 1.4694 & \beta = 1.4694 \\ \hline & \text{Mediterranean} & \alpha = 2.3053 & \alpha = 2.3053 & \alpha = 1.4243 & \alpha = 1.4243 \\ \hline \end{array}$	Tropical/subtropical	$\alpha = 6.4389$	•	•		$\alpha = 6.4389$	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	conifer	β = 1.0556 *	-	-	-	β = 1.0556	-
$\begin{array}{c} \alpha = 0.68255 \\ \beta = 1.6939 \\ (mixed east) \\ \alpha = 0.18321 \\ \beta = 2.1059 \\ (west) \\ \alpha = 0.71774 \\ \beta = 1.6892 \\ \end{array} \xrightarrow{\begin{subarray}{l} \alpha = 0.71774 \\ \beta = 1.6892 \\ \hline \end{subarray} = 1.6892 \\ \hline \end{subarray} \xrightarrow{\begin{subarray}{l} \alpha = 0.71774 \\ \beta = 1.6892 \\ \hline \end{subarray} = 1.6892 \\ \hline \end{subarray} \xrightarrow{\begin{subarray}{l} \alpha = 0.023409 \\ \beta = 2.8782 \\ \hline \end{subarray} = \frac{\alpha = 0.023409 \\ \beta = 2.8782 \\ \hline \end{subarray} = \frac{\alpha = 0.023409 \\ \beta = 2.8782 \\ \hline \end{subarray} = \frac{\alpha = 1.1633 \\ \alpha = 1.3403 \\ \alpha = 1.4694 \\ \hline \end{subarray} = 1.4243 \\ \hline \end{subarray} = 1.42$	•	$\beta = 1.536$ $\alpha = 0.689 \text{ mix}$	-	-	$\alpha = 1.1799$ $\beta = 1.536$ (east) $\alpha = 0.061015$		
Boreal/taiga $\beta = 2.8782$ $\beta = 1.1627 *$ Tropical/Subtropical $\alpha = 1.1633$ savanna, shrubland $\beta = 1.504$ Temperate savanna, $\alpha = 1.3403$ $\alpha = 1.3403$ $\alpha = 1.3403$ $\alpha = 1.3403$ shrubland $\beta = 1.4694$ $\beta = 1.4694$ $\beta = 1.4694$ $\beta = 1.4694$ Mediterranean $\alpha = 2.3053$ $\alpha = 2.3053$ $\alpha = 1.4243$ $\alpha = 2.3053$	Temperate conifer	$ \begin{aligned} &\alpha = 0.68255 \\ &\beta = 1.6939 \\ &(\text{mixed east}) \\ &\alpha = 0.18321 \\ &\beta = 2.1059 \\ &(\text{west}) \\ &\alpha = 0.71774 \\ &\beta = 1.6892 \end{aligned} $			β = 1.6939		-
savanna, shrubland $\beta = 1.504$ Temperate savanna, $\alpha = 1.3403$ shrubland $\beta = 1.4694$ Mediterranean $\alpha = 2.3053$ $\alpha = 2.3053$ $\alpha = 1.4243$ $\alpha = 1.4243$	Boreal/taiga		-	-		-	-
Temperate savanna, $\alpha = 1.3403$ $\alpha = 1.3403$ $\alpha = 1.3403$ $\alpha = 1.3403$ shrubland $\beta = 1.4694$ $\beta = 1.4694$ $\beta = 1.4694$ $\beta = 1.4694$ Mediterranean $\alpha = 2.3053$ $\alpha = 2.3053$ $\alpha = 1.4243$	Tropical/Subtropical	$\alpha = 1.1633$	$\alpha = 1.1633$	$\alpha = 1.1633$	$\alpha = 1.1633$	$\alpha = 1.1633$	$\alpha = 1.1633$
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	savanna, shrubland	$\beta = 1.504$	$\beta = 1.504$	β=1.504	β=1.504	$\beta = 1.504$	$\beta = 1.504$
Mediterranean $\alpha = 2.3053$ $\alpha = 1.4243$ $\alpha = 1.4243$ $\alpha = 2.3053$	Temperate savanna,	$\alpha = 1.3403$	$\alpha = 1.3403$	$\alpha = 1.3403$	$\alpha = 1.3403$		$\alpha = 1.3403$
-	shrubland	$\beta = 1.4694$	β = 1.4694	$\beta = 1.4694$	$\beta = 1.4694$	-	$\beta = 1.4694$
forest, woodlands $B = 1.3171$ $β = 1.3171$ $β = 1.595$ $β = 1.5953$ $β = 1.3171$	Mediterranean	$\alpha = 2.3053$	<i>α</i> =2.3053	$\alpha = 1.4243$	$\alpha = 1.4243$		$\alpha = 2.3053$
	forest, woodlands	B = 1.3171	β = 1.3171	β = 1.595	β = 1.5953	-	$\beta = 1.3171$

Table S2. List of allometric equations used to convert GLAS LiDAR-derived Lorey's height to AGB. Equation is of the form AGB = αH^{β} , where H is Lorey's height.

* Only mean heights were available, coefficients are for mean canopy height with Lorey's height converted to mean canopy height before applying allometric equation.



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