Supplementary Material

Text S1, Tables S1-S4, and Figure S1-S2.

Text S1. Description of the process for alignment of drone-based images collected on different dates

1. The first overflight (Only once)

    (a) process the first overflight (once only), (b) process photographs using the Z of the flight plan (100 m takeoff point) in Agisoft Metashape, (c) align and georeference the orthomosaic using the LiDAR data as a baseline in a GIS environment, (d) extract control points and Z values from LiDAR, and (e) process photos in Agisoft Metashape using the control points as markers.

2. The second, third, etc overflights

    After this first processing, the remaining overflights followed the following flow: (a) alignment of the photographs in Agisoft Metashape (b) chunk alignment of the two point clouds based on the first overflight and (c) final processing in Agisoft Metashape.

Table S1. Data collection period at the INVENTA plot, Central Amazon, Brazil, from September 18, 2018 to January 19, 2021. Period of the overflight (UAV Imagery) and field data campaigns with their respective time intervals in days.

UAV Imagery		Field data	
Collection Date	Interval (days)	Collection Date	Interval (days)
9/18/2018			
10/24/2018	36		
12/27/2018	64		
01/12/2019	16		
04/05/2019	83		
5/28/2019	53		
6/24/2019	27		
7/15/2019	21		
8/17/2019	33		
8/29/2019	12		
9/25/2019	27		
10/21/2019	26		
11/01/2019	11	11/01/2019	

11/30/2019	29		
12/15/2019	15	12/15/2019	44
1/30/2020	46		
2/19/2020	20	2/19/2020	66
3/31/2020	41		
4/16/2020	16	4/16/2020	57
5/25/2020	39		
6/16/2020	22	6/16/2020	61
7/29/2020	43		
8/18/2020	20	8/18/2020	63
9/29/2020	42		
10/14/2020	15	10/14/2020	57
11/30/2020	47		
12/14/2020	14	12/14/2020	61
1/19/2021	36	1/19/2021	36

Table S2. Confusion matrix between each gap event observed in the UAV imagery and in the field data at the INVENTA plot, Central Amazon, Brazil, from November 01, 2019 to January 19, 2021. The gaps identified in the UAV imagery are considered as observed value that have been validated in the field (true value).

	Field data (True Value)	
UAV Imagery **(Observed values)**	14 (True Positive – TP)	3 (False Negative – FN)
	1 (False Positive – FP)	0 (True Negative – TN)

Table S3. Paired t-test p-values between gaps measured by both methods (UAV imagery and Field Data) at the INVENTA plot, Central Amazon, Brazil, in the period from September 18, 2018 to January 19, 2021.

Paired t-test (p-value)		
Area	Perimeter	GSCI
0,8544	0,01019	< 0,001

Table S4. Cumulative frequency and area of gaps measured by UAV imagery and field data for 28 months, in the INVENTA plot, Central Amazon, Brazil, in the period from September 18, 2018 to January 19, 2021.

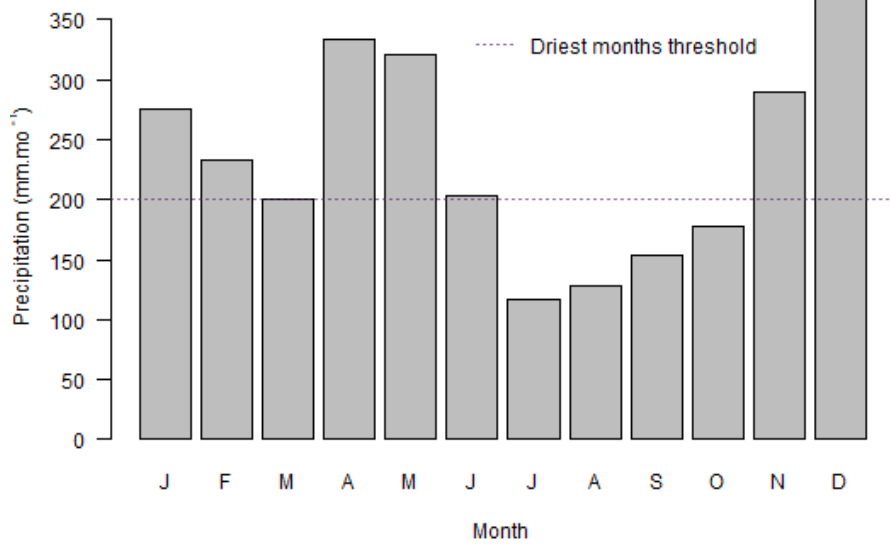| Method	Cumulative frequency (% of total number)				
	$\leq 20\ m^2$	$\leq 25\ m^2$	$\leq 30\ m^2$	$\leq 35\ m^2$	$\leq 40\ m^2$
Field data	10.34	24.14	27.59	37.93	44.83
UAV Imagery	13.79	24.14	37.93	44.83	51.72
	Cumulative area (% of total area)				
	$\leq 20\ m^2$	$\leq 25\ m^2$	$\leq 30\ m^2$	$\leq 35\ m^2$	$\leq 40\ m^2$
Field data	2.12	6.68	8.05	12.98	16.83
UAV Imagery	2.44	5.35	9.96	12.86	16.01

Figure S1. Mean monthly precipitation measured near (~2 km) the INVENTA plot, Central Amazon, Brazil during the study period.
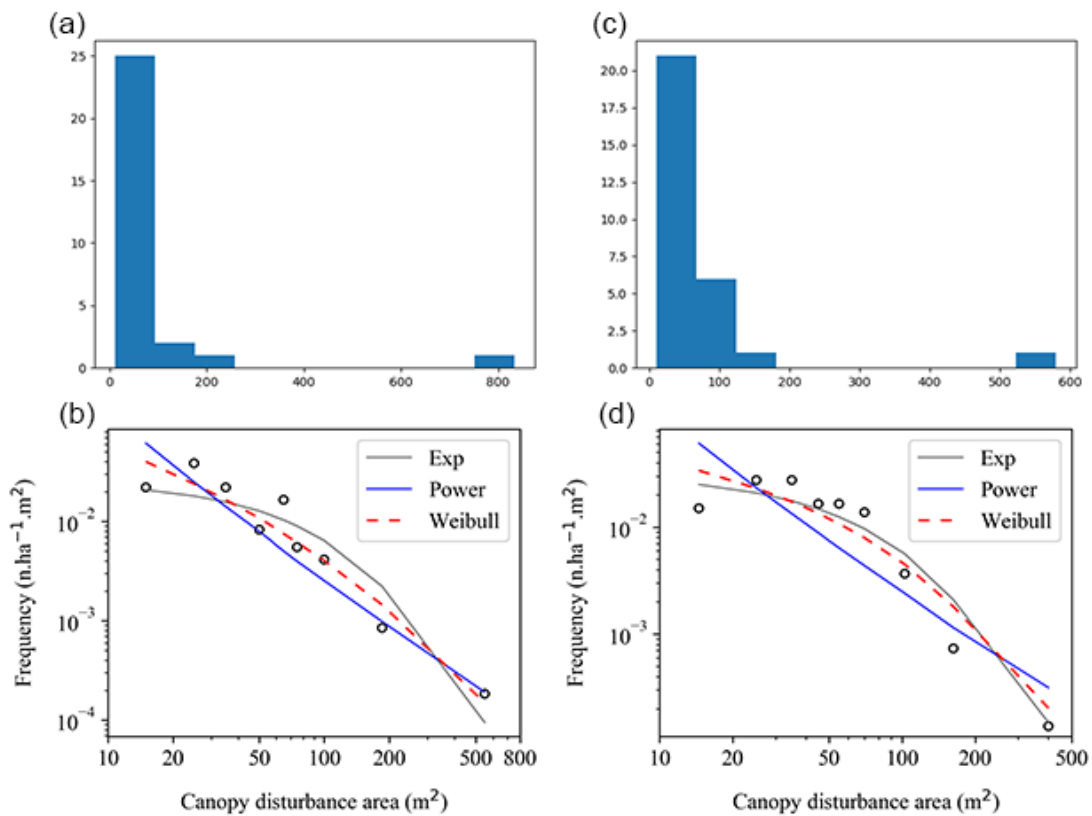

Figure S2. Observed size distributions of gaps at the INVENTA plot, Central Amazon, Brazil, in the period from September 18, 2018 to January 19, 2021. Distribution of gaps across area classes for UAV imagery (a) and field data (c). Size distribution of gaps larger than 10m^2, along with maximum likelihood fits under three alternative functional forms (exponential, power, and Weibull functions) for UAV imagery (b) and field data (d).