Online Resource 1 – Modeling Earth Systems and Environment – Reconstructing canopy cover in a Cerrado–Pantanal ecological corridor from 1985 to 2024 with GEDI lidar, Landsat and neural network regression

Table S1 Landsat scenes in the June–August composites, by year and sensor

Year	Scenes	Scenes per sensor	Use
1985	11	Landsat 5=11	monitoring epoch
1995	4	Landsat 5=4	monitoring epoch
2005	15	Landsat 5=15	monitoring epoch
2015	16	Landsat 8=16	monitoring epoch
2019	17	Landsat 8=17	training
2020	21	Landsat 8=21	training
2021	20	Landsat 8=20	training
2022	37	Landsat 9=19, Landsat 8=18	temporal validation
2024	41	Landsat 9=21, Landsat 8=20	monitoring epoch

Table S2 Composition of the spatial folds (10 km blocks) and out-of-fold RMSE and CCC per fold

Fold	Footprints	Blocks	RMSE MLR	RMSE RF	RMSE GB	RMSE MLP	CCC MLP
1	1,015	25	0.235	0.237	0.234	0.232	0.51
2	977	25	0.237	0.237	0.233	0.235	0.49
3	973	24	0.231	0.238	0.233	0.227	0.60
4	971	24	0.239	0.245	0.239	0.237	0.56
5	1,074	28	0.237	0.240	0.239	0.238	0.53

Table S3 Error of the selected model (MLP) by GEDI cover class

Class	CV n	CV RMSE	CV bias	2022 n	2022 RMSE	2022 bias
0.0-0.2	1,002	0.243	0.190	200	0.213	0.159
0.2-0.4	1,002	0.224	0.177	200	0.208	0.164
0.4-0.6	1,002	0.130	0.030	200	0.132	0.036
0.6-0.8	1,002	0.174	-0.128	200	0.197	-0.130
0.8-1.0	1,002	0.342	-0.312	200	0.404	-0.365

CV, spatial cross-validation (2019–2021 footprints)

Table S4 Area (ha) per predicted cover class by epoch (pixels valid in all epochs)

Year	0.0-0.2	0.2-0.4	0.4-0.6	0.6-0.8	0.8-1.0
1985	276,166.8	331,586.4	96,429.4	5,616.3	0.0
1995	223,769.1	308,484.6	160,860.1	16,672.0	13.1
2005	399,612.1	171,231.1	122,092.4	16,862.5	0.7
2015	235,615.9	158,825.8	200,547.4	114,384.3	425.4
2024	364,037.9	107,151.7	157,527.8	80,385.5	695.9

Table S5 Mean predictors and mean predicted cover at the training locations, by epoch

Year	Blue	Red	NIR	SWIR1	NDVI	EVI	Greenness	Predicted cover

1985	0.034	0.066	0.235	0.206	0.564	0.309	0.115	0.327
1995	0.028	0.050	0.234	0.166	0.588	0.339	0.129	0.418
2005	0.030	0.065	0.237	0.208	0.578	0.311	0.118	0.370
2015	0.024	0.042	0.256	0.185	0.725	0.404	0.153	0.522
2024	0.026	0.055	0.254	0.199	0.659	0.362	0.141	0.470

Locations of the training footprints; TM epochs harmonized to OLI (Roy et al. 2016)

Table S6 Semivariogram of the out-of-fold residuals of the MLP (a) and sensitivity of the cross-validation to the block size (b)

Distance (km)	Pairs	Semivariance
0.0–1.0	4,921	0.0472
1.0–2.0	10,524	0.0496
2.0–3.0	14,058	0.0513
3.0–5.0	33,669	0.0512
5.0–7.5	48,268	0.0524
7.5–10.0	54,597	0.0505
10.0–15.0	135,559	0.0491
15.0–20.0	175,550	0.0509
20.0–30.0	450,448	0.0515
30.0–40.0	535,973	0.0515
40.0–60.0	1,049,861	0.0521

(a) 3,000 random training footprints; variance of the residuals 0.0545

Table S6b Out-of-fold RMSE by block size

Block	MLR	RF	GB	MLP	Selected
5 km	0.235	0.238	0.235	0.233	MLP
10 km	0.236	0.239	0.236	0.234	MLP
20 km	0.236	0.240	0.237	0.235	MLR

(b) Selection rule: lowest RMSE; difference < 0.001 → highest CCC