

SUPPLEMENTARY INFORMATION

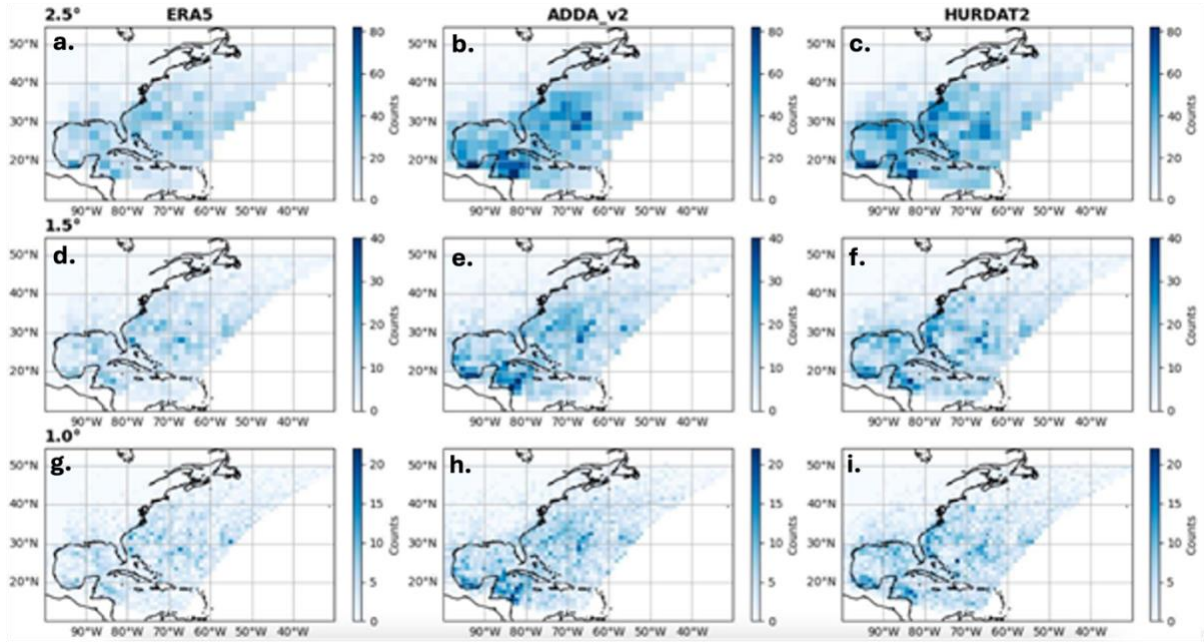


Fig S1. Track density for (a),(d),(g) ERA5, (b),(d),(h) ADDA_v2, and (c),(f),(i) HURDAT2 at various grid resolutions. Upper panel uses 2.5° bins, middle panel uses 1.5° bins, and bottom panel uses 1° bins. Track density is determined as the number of TC centroids counted within each grid cell over the full 20-year simulation period.

	RMSE	Precision Difference	Mean Error	Modeling Yield	Pattern Correlation	Q95 diff
2.5° bin						
ERA5	11.19	-6.17	-6.95	0.60	0.92	-16.0
ADDA_v2	9.88	0.76	0.24	1.27	0.84	-1.0
1.5° bin						
ERA5	4.38	-2.31	-2.38	0.69	0.88	-6.0
ADDA_v2	4.78	0.31	0.11	1.18	0.76	0
1.0° bin						
ERA5	2.32	-1.04	-1.10	0.76	0.81	-3.0
ADDA_v2	2.76	0.13	0.05	1.38	0.67	0

Table S1. Summary of statistics for track density at each bin size, as shown in Fig. S1.

	RMSE	Precision Difference	Mean Error	Modeling Yield	Pattern Correlation	Q95 diff
Track Density						
ERA5	11.31	-6.17	-6.95	0.60	0.90	-16.0
ADDA_v2	9.92	0.76	0.24	1.27	0.84	-1.0
Initial Location						
ERA5	1.17	-0.78	-0.28	0.64	0.83	0.0
ADDA_v2	1.34	-0.39	-0.003	0.57	0.70	1.0
Translation Speed						
ERA5	3.89	0.31	0.56	0.73	0.82	N/A
ADDA_v2	4.59	0.08	1.21	1.03	0.72	N/A

Table S2. As in Table S1, but for the track density, initial location, and translation speed using 2.5° bins, as shown in Fig. 3.

Test Statistic	ERA5	ADDA_v2
10 m Wind		
Kolmogorov-Smirnov	0.278	0.217
Cramér-von Mises	57.64	28.04
Anderson-Darling	415.81	255.802
MSLP		
Kolmogorov-Smirnov	0.087	0.0524
Cramér-von Mises	4.772	1.376
Anderson-Darling	51.658	18.805

Table S3. Summary statistics for nonparametric statistical testing of the distributions in Fig. 5. Tests are conducted at a 5% significance level. Note that p values are all $< .01$, indicating a significant difference between the distributions for all statistics.

Test	ERA5	ADDA_v2
Kolmogorov-Smirnov		
Test Statistic	0.153924	0.103102
<i>p</i> Value	0.021607	0.130906
Cramer Von-Misses		
Test Statistic	0.502725	0.308357
<i>p</i> Value	0.039184	0.128222
Anderson-Darling		
Test Statistic	3.782419	1.879279
<i>p</i> Value	0.009745	0.054572

Table S4. Summary statistics for nonparametric statistical testing of the distributions in Fig. 8e and 8j. Bold *p* values indicate distributions are statistically similar at a 5% significance level.

Test	ERA5	ADDA_v2
Kolmogorov-Smirnov		
Test Statistic	0.4055335	0.21102
<i>p</i> Value	0	0.000025
Cramér-von Mises		
Test Statistic	5.139462	1.601892
<i>p</i> Value	0	0.000101
Anderson-Darling		
Test Statistic	33.8945	13.43582
<i>p</i> Value	0.001	0.001

Table S5. As in Table S4, but for Fig. 8d and i